NOAA OMNIBUS AUTHORIZATION

HEARINGS

BEFORE THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

NINETY-SEVENTH CONGRESS

SECOND SESSION

ON

OMNIBUS AUTHORIZATION BILL FOR THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

APRIL 19, 21, 22, AND 30, 1982

Serial No. 97-118

Printed for the use of the
Committee on Commerce, Science, and Transportation

U.S. GOVERNMENT PRINTING OFFICE
94-945 O WASHINGTON : 1982

S261-55

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NOAA OMNIBUS AUTHORIZATION

MONDAY, APRIL 19, 1982

U.S. SENATE
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, D.C.

The subcommittee met, pursuant to notice, at 3:10 p.m., in room 235, Russell Senate Office Building, Hon. Harrison Schmitt presiding.

Staff members assigned to these hearings: Dennis W. Barnes, Carol S. Lane, William J. McCluskey, Jr., Dennis J. Phelan, and Wim J. Van Teeffelen, professional staff members; Deborah J. Stirling, James S. W. Drewry, minority staff counsels, and Steven H. Flajser, minority professional staff member.

OPENING STATEMENT BY SENATOR SCHMITT

Senator SCHMITT. Welcome, ladies and gentlemen, to the late afternoon hearing of the Commerce, Science, and Transportation Committee. This is the first of four hearings on an omnibus authorization bill for the National Oceanic and Atmospheric Administration.

This year the Committee on Commerce, Science, and Transportation is considering for the first time such an omnibus authorization bill for essentially all of the programs under NOAA. Such a bill, when passed, will enable this committee to review more regularly than ever before research, service, and regulatory efforts and plans of NOAA as one of the premier sicence and applications agency of the Federal Government.

Such a review is especially important during times of budgetary stress under which we all must live, so that the Congress can make its intentions known regarding the appropriate balance and levels of effort among the different missions of NOAA, rather than seeing these levels set by more or less a piecemeal effort generally through the appropriations process.

In the past we have too often diffused our attentions to NOAA by considering only a few programs at a time, usually those specifically requiring reauthorization or new authorization. These programs, while important in their own right, have not collectively represented the NOAA missions, nor have they been evaluated one against the other or in relation to the general traditional programs of the agency.

By way of background, NOAA was created in 1970 by the reorganization plan No. 4, which combined the Environmental Science Services Administration from the Department of Commerce with a number of programs of the Departments of the Interior, Defense, and Transportation. Since 1970 a number of additional responsibilities have been delegated to NOAA by law, particularly under the Coastal Zone Management Act of 1972, the Deep Seabed Hard Minerals Resources Act, and the Ocean Thermal Energy Conversion Act of 1980.

NOAA's programs are now authorized by well over 100 public laws. Some of the programs operate under standing legislation dating back as far as 1914. Only a small portion of the overall NOAA activity is specifically authorized on a regular basis. We now have an opportunity to correct this situation and to better serve all concerned, and to be able to view much more comprehensively NOAA programs in relation to other programs of the Department of Commerce and other science and technology activities of the Federal Government and the country as a whole.

We will be considering the NOAA programs this year under four general categories: atmospheric programs; satellite programs—that is, space satellite programs; ocean programs; and living marine resources programs.

Today's hearing will focus on the National Earth Satellite Service and the Environmental Data and Information Service. The broad-scale use of the unique view of the Earth offered by satellites began in the 1960's with the development of telecommunications and weather satellite systems. The obvious success of these efforts, culminating in Comsat, Intelsat, and the World Weather Watch, was based on the long-established need for global communications and weather forecasting information.

In 1961 the first appropriation for a national operational meteorological satellite system was made, and the basic program consisting today of both polar-orbiting satellites and geostationary satellites began. NOAA's satellite programs provide fundamental tools for carrying on their own atmospheric and ocean programs as well as providing information for national and international climate programs, agriculture, fisheries, mineral resources, and other weather and land applications, not to mention their basic value in absolute science terms.

The use of satellites for these purposes, combined with the use of satellites for land remote sensing, may, if adequate attention is devoted to this valuable tool, provide us with a truly global information system.

In fact, if we are willing to reach out and grasp the opportunity, the decade of the 1980's can in fact become the information age with respect to the Earth's natural environment.

Perhaps one of the largest obstacles in achieving this, particularly in times of tight budgets, is being able to evaluate the added knowledge obtained from satellite systems with respect to the large costs for satellites themselves. This includes both instrument development and information systems needed to analyze the data. And it is my hope that in making these decisions we will not sacrifice long-term benefits solely for shortsighted budgetary justifications.

Finally, the Environmental Data and Information Services receives global meteorological and climatological data and information from other segments of NOAA, other agencies, organizations, and individuals both domestic and foreign, and incorporates them into the national environmental data base.

This data base serves users in industry, agriculture, science, engineering, commerce, and the general public, and Federal, State, and local governments. If nothing else, an authorization bill dealing with NOAA will teach us all how to pronounce the term of art that goes with your agency. So we will begin with a brief review of NOAA followed by an in-depth review of the NESS and EDIS programs.

We have with us today Dr. Anthony Calio, the Deputy Administrator of NOAA. And he is accompanied by several colleagues. I will let you introduce your colleagues to make sure I get everybody correctly, Tony. Please proceed.

STATEMENT OF DR. ANTHONY J. CALIO, DEPUTY ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE, ACCOMPANIED BY JOHN H. McELROY, ASSISTANT ADMINISTRATOR FOR SATELLITES; MARGARET E. COURAIN, ACTING DIRECTOR, ENVIRONMENTAL DATA AND INFORMATION SERVICE; AND JAMES SMITH, BUDGET OFFICER

Dr. Calio. Thank you, Mr. Chairman. To my right is Dr. John McElroy, the Assistant Administrator for the National Earth Satellite Service. To my left is Margaret Courain, the Acting Director for the Environmental Data and Information Service. And to her left is Jim Smith, from NOAA's office of Budget and Resources Management.

I have two prepared statements today, Mr. Chairman, the first one is a general summary of NOAA's mission and Dr. Byrne's plans which I would like to summarize on behalf of the Administrator, who could not be here today. I do not believe my summary could be any more revealing than your opening statement. Many of the comments you expressed are incorporated in Dr. Byrne's prepared statement but I will try to do that, if I may.

Senator Schmitt. I am sorry, I was not attempting to usurp the authority of the Administrator. As you know, I have had considerable interest in these programs for a long time. Please proceed, Tony, as you see fit. And also, we will make the entire statement as part of our record.

Dr. Calio. Thank you, Mr. Chairman.

As you have outlined, NOAA's primary missions are services, scientific research to support those services, and management of our statutory regulatory and coordination responsibilities. To help you understand the levels of effort devoted to each of these activities, approximately 75 percent of our effort goes into services, about 15 to 20 percent—it varies from time to time—into scientific research supporting those services, and approximately 5 to 10 percent into regulatory activity. As part of the Department of Commerce, NOAA is responsible for managing and conserving selected oceanic, coastal, and atmospheric resources and for applying managerial, research and technical expertise to provide environmental services and essential scientific information.

Our activities are structured into five primary operational program units, each headed by an assistant administrator.

In our fisheries activities, which fits under the rubric of the National Marine Fisheries Service, we manage and conserve fishery resources within 200 miles of the U.S. coast. And we try to protect vital habitats of marine mammals and other endangered species.

Our Oceanic and Atmospheric Services reports and forecasts the weather, manages a major portion of the Federal Government's civil oceanographic fleet and prepares nautical and aeronautical charts and other navigational aids.

The National Earth Satellite Service manages the Nation's civilian meteorological satellite program, which regularly and reliably collects global atmospheric and Oceanic data that provides information for use in weather forecasting, snow and ice mapping, frost monitoring, ocean thermal-feature identification and many other uses. We are also making plans for the transfer of the LANDSAT system from NASA to NOAA.

In the Coastal Zone Management component, we establish national policies for use and protection of the coastal areas and protection of wetlands and beaches and manage and protect unique estuarine and coastal enclaves. NOAA's Research and Development Division is invoved in projects that are quite far-reaching in the environmental area. NOAA's laboratories through their university relationships have undertaken such activities as understanding ocean pollution, climate, and long-range weather forecasting and modification.

Our research and development unit also manages the SEAGRANT program which provides grants to universities to fund development and operation of programs of marine research, education, and establishment of advisory services. NOAA's R. & D. also coordinates and direct major multiagency international research activities.

Recently we established an Office of Ocean Minerals and Energy to implement the statutory responsibilities for the regulation of deep seabed mining and ocean thermal energy conversion activities.

An addition to NOAA's primary services NOAA also has responsibility for coordination and development of the Federal Governments' 5-year plans for ocean pollution and climate research.

NOAA has accomplished during the past year. For example NOAA scientists model the effects of CO_2 in the atmosphere, study the nature of acid rain, determine the source, fate and effects of pollutants in the marine environment and monitor changes in marine populations. We prepare daily weather and longer-range climate forecasts, warn of severe weather and assess natural and manmade changes to our environment.

We are steadily improving our lifesaving ability to forecast hurricanes and tornados. Important improvements have been made in models for forecasting storm surges; the destructive result of hurricanes. We have seen a significant improvement in predicting where tornadoes are likely to occur, and this was a significant factor in the declining number of deaths due to tornadoes.

We are in the process of improving the accuracy and efficiency of our weather forecasting ability through the development and demonstration of the Automation of Field Operations and Services [AFOS] system. And we are currently studying development of new techniques such as doppler radar systems, which we call NEXRAD, to be used in ground-based observations.

As I indicated earlier, in the research and development area, we have documented acid rain effects in eastern North America and northern Europe. We have observed a very interesting phenomenon when studying the acid rain concentration in the Pacific which may suggest either that specific materials can be transported great distances or that there are significant natural acid precursors. We are studying the effects of mesoscale convective complexes (MCCIS), which are essentially instabilities in the upper layers of the atmosphere, to see if we can predict the onset of severe storms.

A component of NOAA not mentioned but key to servicing NOAA's user communities is the Environmental Data and Information Service [EDIS], which obtains satellite data and data collected from other sources, analyzes them and distributes information to universities, the private and the public sectors and the global community.

NOAA, like all other agencies in the Federal Government, is going through a fundamental reassessment. The President has asked us to reduce Federal involvement in certain activities, transfer appropriate activities to State and local governments, recover costs that can be allocated to users, eliminate program costs of lower priority and reduce Federal overhead and personnel costs.

We in NOAA are convinced that our activities in the next fiscal year will make an important contribution to meeting the President's goal by helping the Nation manage its ocean and atmospheric resources more efficiently.

That concludes my summary of Dr. Byrne's statement, Mr. Chairman. I would be happy to answer any questions you may have.

[The statement follows:]

STATEMENT OF DR. JOHN V. BYRNE, ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE

Mr. Chairman and Members of the Committee, I am pleased to appear before you to discuss NOAA's science and service activities.

NOAA's primary mission is services, scientific research to support those services, and management of our statutory, regulatory and coordination responsibilities. As part of the Department of Commerce, NOAA is responsible for managing and conserving selected oceanic, coastal and atmospheric resources, and for applying managerial, research and technical expertise to provide environmental services and essential scientific information. These missions are derived from over one hundred separate statutory authorities.

Our operations are geographically diversified: they require ships, satellites, aircraft and buoys. They depend upon complex computer and communications systems. Some of NOAA's components have a tradition of public service that began in the days of the founding fathers. NOAA was established in the Department of Commerce in 1970, but the Coast and Geodetic Survey and the old Weather Bureau date back more than 150 years to the time of President Jefferson.

NOAA's primary operational programs are organized into five major line components (MLCs), each headed by an Assistant Administrator.

NATIONAL MARINE FISHERIES SERVICE

Manages and conserves fishery resources within 200 miles of the U.S. coast;

Protects vital habitats of living marine resources including marine mammals, such as whales, and other endangered species, like turtles;

Assists the U.S. commercial and recreational fishing interests; and

Conducts research in support of all its missions.

OCEANIC AND ATMOSPHERIC SERVICES

Reports and forecasts the weather, including warnings of hurricanes, tornadoes, flash floods and other inclemencies;

Manages a major portion of the Federal Government's civil oceanographic fleet;

Prepares nautical and aeronautical charts and other navigational aids;

Operates the largest environmental data-storage and retrieval system in the world; and

Develops and maintains ocean technology for NOAA components.

NATIONAL EARTH SATELLITE SERVICE

Manages the Nation's meteorological satellite program to assist weather forecasting; and

Plans for transfer of the Landsat System to NOAA.

COASTAL ZONE MANAGEMENT

Establishes national policies for use and protection of coastal areas;

Has provided funds to states to develop and carry out comprehensive state programs to manage coastal resources and to protect wetlands and beaches;

Manages and protects unique estuarine and coastal enclaves with purchase grants and by designating estuarine and marine sanctuaries; and

Seeks to harmonize Federal decisions vis-a-vis the coasts in order to minimize user conflicts.

RESEARCH AND DEVELOPMENT

Conducts environmental research in NOAA laboratories and through universities on ocean pollution, climate, and weather forecasting and modification;

Through the Sea Grant Program, has provided grants to universities to develop and operate programs of marine research, education and advisory services;

Coordinates and directs major multi-agency international research programs such as the Global Atmospheric Research Program; and

Coordinates NOAA marine pollution-assessment activities.

NOAA has established an Office of Ocean Minerals and Energy in the Office of the Administrator to implement its statutory responsibilities for the regulation of deep seabed mining ocean thermal energy conversion systems.

NOAA also has the responsibility to coordinate and develop 5-year plans for Federal Government programs in ocean pollution and climate research.

NOAA ACCOMPLISHMENTS

Before coming to NOAA, I recognized its most valuable resources are its people and their accomplishments. The finest scientists, technicians and managers perform innovative research, apply that research to national needs, supply essential information about the environment to a vast clientele and make recommendations to resolve conflicts over the present state and uses of the ocean-atmosphere complex. For example, NOAA scientists model the effects of CO_2 on the atmosphere, study the nature of acid precipitation, determine the source, fate and effects of pollutants in the marine environment, and monitor changes in marine populations. They prepare daily weather and longer-range climatic forecasts, warn of severe weather and assess natural and man-made changes to our environment. NOAA technicians produce and distribute nautical and aeronautical charts; collect, process and disseminate all types of atmospheric and oceanic information; and operate ships, satellites, buoys, aircraft and radars. NOAA managers protect U.S. living marine resources and their habitats, assist the development of new ocean industries, and coordinate local efforts to protect coast lines in process of development. These traditional services account for a major portion of NOAA's budget.

The list of NOAA accomplishments is a long one, even for a single year; I will mention only a few highlights.

WEATHER SERVICES

NOAA is steadily improving its life-saving ability to forecast hurricanes and tornadoes. During the past year, NOAA provided forecasts for 10 hurricanes, including periods in which as many as three storms were active simultaneously. Important improvements have been made in the development and use of models for forecasting storm surges, the most destructive result of hurricanes along the Atlantic and Gulf coasts. We have seen a significant improvement in predicting where tornadoes are likely to occur, and this was a significant factor in the declining number of deaths due to tornadoes during the past year. NOAA has also strengthened its ability to forecast and warn the public of major river-basin flooding and flash floods.

NOAA is improving the accuracy and efficiency of its weather forecasting through the development and demonstration of the Automation of Field Operations and Services (AFOS) system. This system applies modern computer-based technology and automatic techniques to day-to-day weather service operations.

NOAA has moved forward in the develop of the Next Generation Weather Radar (NEXRAD) program. The Joint Systems Program Office is now staffed by NOAA, DOD and FAA, and the system acquisition is progressing.

MAPPING AND CHARTING

The National Ocean Survey made the first discovery of large polymetallic sulphide ore deposits on the seafloor using the NOAA SEABEAM system and the submersible ALVIN. This discovery of a 25 million-ton mass on Pacific Ocean floor has revolutionized concepts of marine minerals formation and mining. These ores, containing a number of strategic metals, may provide a better incentive for ocean mining than manganese modules.

We have recently developed a system to improve the productivity and safety of marine transportation in major port areas by disseminating tide level data to ship operators in real-time. In the Port of New York, our National Ocean Survey recently completed a basic charting survey which revealed discrepancies in existing harbor charts. Also, new high-accuracy hydrographic data provided by the survey could reduce the estimated cost of dredging for 60-foot draft vessels by millions of dollars.

RESEARCH AND DEVELOPMENT

Acid rain has been documented in eastern North America and northern Europe. Its coincidence with man-made sources of sulfur oxides and nitrogen oxides points the finger at utilities, transportation and industry as the source. However, NOAA has measured acidity in rains remote from man-made sources in locations such as the NOAA Mauna Loa Observatory on Hawaii and Amsterdam Island in the southern Indian Ocean where we find acidity to be surprisingly high, at times as high as in eastern North America. This suggests that either the acidic materials can be transported great distances or that there are significant natural acid precursors. Either explanation would bear significantly on our choice of corrective measures.

The relatively recent discovery of mesoscale convective complexes (MCCs) points the way towards better prediction of severe weather. NOAA researchers have shown that thunderstorms act in concert in large complexes the size of an entire state or more. Typically some 50–100 of these complexes—which contribute approximately 60 percent of the warm-season rainfall in the U.S. but frequently lead to tornadoes, flash floods or hail—move eastward across the United States each summer. Studies by NOAA and university scientists indicate that, in principle, MCCs are predictable.

NOAA's Environmental Data and Information Service developed a national model describing the impact of temperature anomalies on energy demand. As a result, EDIS now issues monthly and seasonal projections of such demand for multi-state regions during both the heating and cooling seasons. These estimates go to the Department of Energy and to other Federal agencies responsible for energy use and planning, to State energy agencies and to industry.

SATELLITES

NOAA's Satellite Service has demonstrated that the new atmospheric sounder instrument carried on the GOES goestationary environmental satellites can obtain temperature and humidity soundings on command to aid both small and large-scale weather forecasts. This instrument has already become operational in support of forecasts of west coast rainfall produced by storm systems moving in from the Pacific. It will substantially improve warnings and forecasts of severe thunderstorms and hurricanes in the Western Hemisphere.

We have begun development of five products which will help the Department of Agriculture improve surveillance of the earth's food crops. The AGRISTARS project—Agricultural Remote Inventory Surveys Through Aerospace Remote Sensing—will use satellite data to make the entire agricultural production cycle more efficient.

NOAA, like all other agencies of the Federal Government, is going through a fundamental reassessment. The President has asked us to reduce Federal involvement in certain activities, transfer appropriate activities to state and local governments, recover costs that can clearly be allocated to users, eliminate programs of lower priority and reduce Federal overhead and personnel costs.

We in NOAA are convinced that our activites in the next fiscal year will make an important contribution to meeting the President's goals by helping the Nation manage its oceanic and atmospheric resources more efficiently.

We are pleased to respond to the Committee's request to appear before you in a series of hearings to discuss NOAA's programs and activities. We will address our satellite programs and how they support all of our atmosphere and ocean activities. We will describe for you NOAA's role in the Nation's atmospheric and climatic programs. We will talk about all of our many diverse ocean service, management, and research programs. Lastly, we will explain NOAA's marine fisheries programs, with emphasis on our activities under the Magnuson Fishery Conservation and Management Act. We hope these hearings will help the Committee get a better understanding of our agency and how we are carrying out our statutory missions.

Senator SCHMITT. Thank you, Tony, very much. Obviously, we are on the right track today. I have not had three people at an S.T. & S. hearing in a long time.

Gentlemen, welcome. Senator Gorton, do you have an opening statement?

Senator GORTON. No.

Senator SCHMITT. Senator Stevens?

Senator STEVENS. No. Thank you, Mr. Chairman.

Senator SCHMITT. I am sure you will have some questions. And we will go through our normal 5-minute drill on questions.

Tony, what were NASA's personnel cuts for fiscal year 1980? We are still in the wrong business.

Dr. CALIO. I have the same difficulty, Mr. Chairman.

Senator SCHMITT. NOAA's personnel cuts for 1982 and 1983 fiscal years.

Dr. CALIO. I think in the 1982 time frame, it is about 860. Right, Jim? 760. 760.

Senator SCHMITT. 1982?

Dr. CALIO. For 1982. And for 1983——

Senator SCHMITT. You can supply that for the record. And would you also give us sort of a 10-year breakdown in whatever detail you think is appropriate of the personnel motion within NOAA, total levels and how the allocation of personnel within the agency's programs has been carried out over the last 10 years.

Dr. CALIO. We can supply that for the record, Mr. Chairman. That would be a little difficult to put together because we are currently going through a restructuring of our activities in the agency.

There is a proposal before the department and the OMB—hopefully, we can bring that forward to Congress very shortly—which is a redistribution of the functions within the agency, with a greater emphasis on our oceans activity and looking at how we might be able to provide that initiative and that direction within our current manpower allocations. So there will be a shift.

Senator SCHMITT. You do not need to do it on the basis of functional levels; just general. I will leave it to your discretion, Tony, on how detailed you can make it and have it meaningful, but some general indication of the history so as we get into this authorization bill, we can have a better perspective of where NOAA has been and where it has been trending over the last 10 years.

Dr. CALIO. Let me see if I understand that. You want a 10-year outlook altogether. You want us to go back over the last 10 years and present an historical perspective and give you some idea?

Senator SCHMITT. Exactly. An historical perspective on the basis of functional activity rather than specific program activity. I am going to let you decide what you think you can do. I know you have been going through a lot of different—through that 10-year period there have been some modifications of programmatic activity. You should know better than we how to break it out. We might have some followup questions, but we would like to get a first cut at it.

Dr. CALIO. Yes, sir, we will prepare that for the record.

Senator SCHMITT. Is NOAA having any problem in attracting or keeping technically trained personnel at this time other than the fact that you are having to fire a lot of them? Is it still an agency that an ambitious meteorologist or oceanographer would like to work for?

Dr. CALIO. I believe so.

Senator SCHMITT. So if the slots were there, you could probably go out and pick up talented people to work in these programs; is that correct?

Dr. CALIO. The reason I was hesitating to answer on that, it is not just a question of the slots, it is a question of stability in the programs. I think as far as the young people being interested in the kinds of things that NOAA does is still there, they are still excited. The oceanography, atmospheric physics, deep seabed mining, I think the young people are enthusiastic about it.

I think they would like to see some stability in the NOAA programs. They are a little bit uncertain about their future. So from that standpoint they may be less prone to join an organization like ours, especially when we are reducing manpower at the present time. But I think that they would be willing to do that if there was that basic program stability.

Senator SCHMITT. Do you feel the threat of higher paying commercial jobs is not as serious to NOAA as it may be to other agencies?

Dr. CALIO. It has its effect, of course, it does.

Senator SCHMITT. Is the salary differential for the types of young bachelors and graduate degree holders as great for NOAA program as it is, say, for DOD and NASA and other programs?

Dr. CALIO. I think it is. Let me check with my colleagues here. I think that is generally true.

Margaret, you are in the information business. What was you. reaction to that question?

Ms. COURAIN. In terms of whether it is challenging or competitive?

Senator SCHMITT. Salaries. Is industry offering major differentials for meteorologists, climatologists, oceanographers?

Ms. COURAIN. Not to my knowledge. I think that there is pretty much parity in those areas, because so many of those people are within the Government; for instance, meteorologists. So it is probably—there is a larger percentage of them than in some other fields.

Dr. CALIO. And I think, to come back to your question, when you talk about marine geologists, I think it is much more difficult for us to attract those individuals than possibly blue water oceanographers or atmospheric physicists, because we are competing with a different kind of environment there.

Senator SCHMITT. Senator Gorton, questions?

Senator GORTON. Just one. In part of your written testimony here on polar-orbiting satellites, your budget reduces what previously was planned for 2 to 1. Is that correct?

Dr. CALIO. The polar-orbiting satellites, yes, sir, that is correct.

Senator GORTON. If you were to describe, say, in percentage terms the difference between 0 and 1 and then the difference between 1 and 2, how much additional knowledge, how much additional information, does the second provide over simply having a single one?

Dr. CALIO. The effect of the reduction is a question of what area of the world you are observing.

Senator GORTON. Is that what the difference is?

Dr. CALIO. Part of the difference is there. You get much less coverage—I should not say much less—you get less.

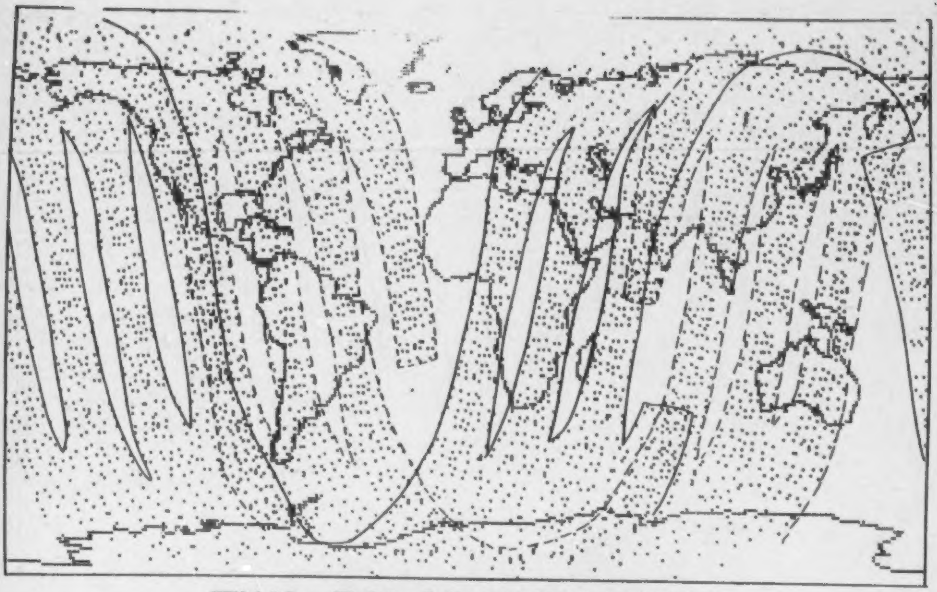
Senator GORTON. Half as much?

Dr. CALIO. No, it is not directly proportional. We lose some areas completely at the equator, and we do not have the same frequency of coverage in the polar regions or the northern latitudes: On the average there is, about a 15-percent reduction in geographical coverage at the equator with a reduction from 2 to 1 satellite. But that depends upon where you are. At some locations along the equator, that coverage will not exist at all.

Dr. MCELROY. The affected area, as Dr. Calio has pointed out, is between nominally 35° north and 35° south, and that is about a 10- to 15-percent reduction in data overall. There is no change in data quality.

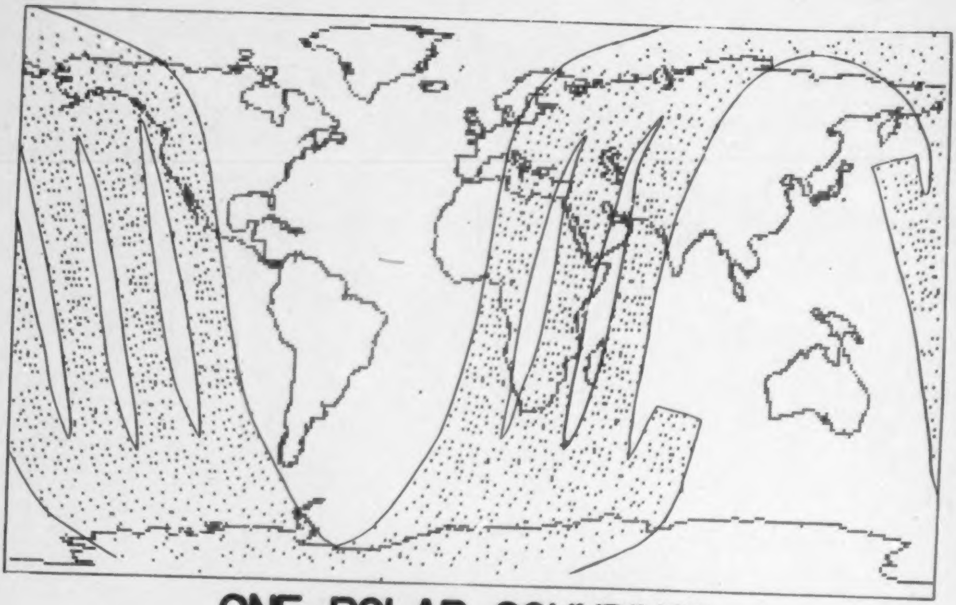
With respect to certain areas along the equator, there are 14 segments around the equator, from 35° north to 35° south, where there will be a complete loss of data. The polar sounding coverage charts that follow may clarify my statement.

[The above-mentioned charts follow:]



TWO-POLAR SOUNDINGS
FOR 00Z MAP

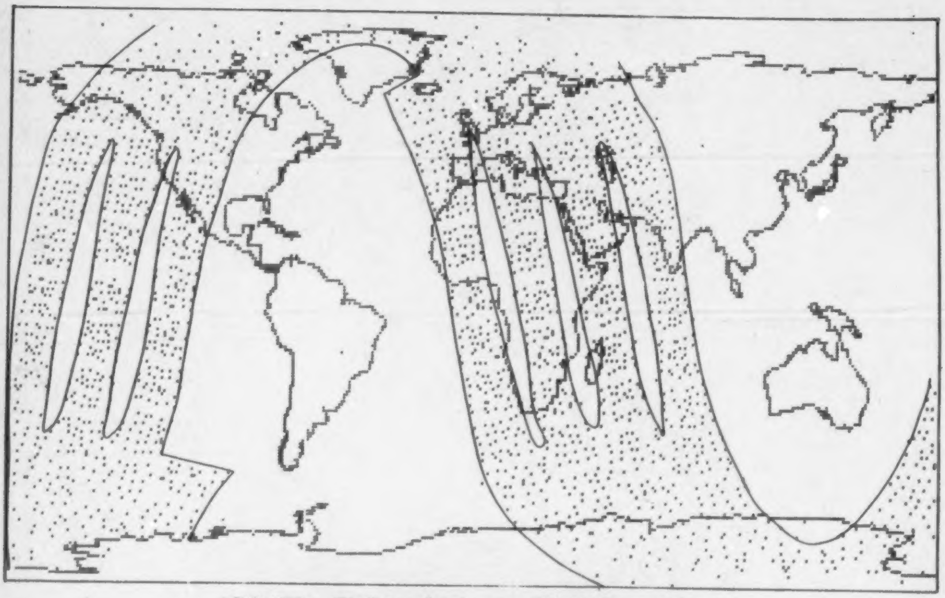
Sounding coverage from two polar-orbiting spacecraft for a six-hour period centered at the NMC synoptic time of 0000 GMT. The actual orbits were taken from one day between 2100 GMT and 0300 GMT. The afternoon spacecraft (NOAA-7) soundings are displayed with an "X" and enclosed in a solid line. The morning spacecraft (NOAA-6) soundings are displayed with an "0" and enclosed in a dashed line. Each orbit produced about 600 soundings with 15-layer mean temperatures, 3-layer precipitable water values, a total ozone value, tropopause parameters, and a cloud cover estimate in each sounding.



ONE-POLAR SOUNDINGS
FOR 00Z MAP

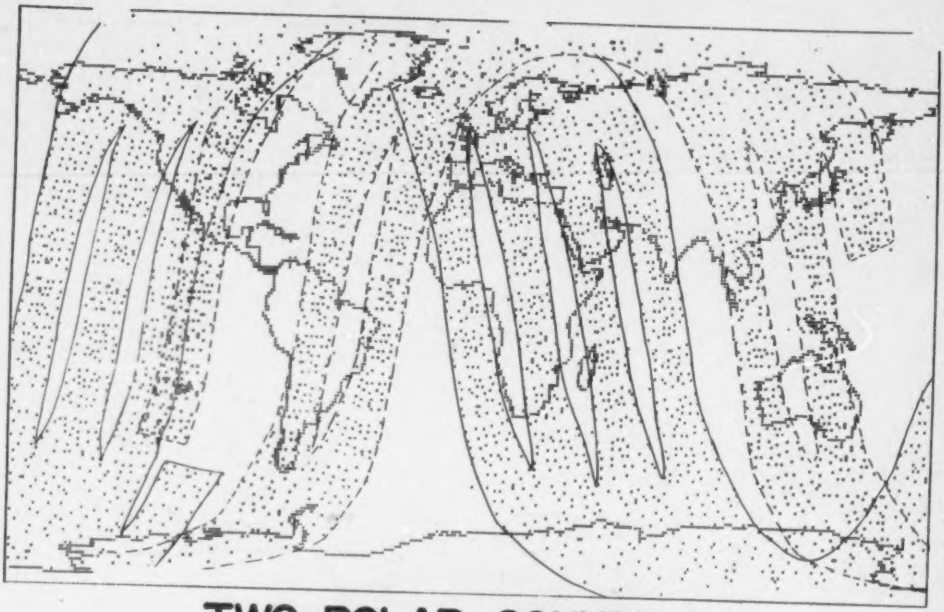
2

Sounding coverage from one polar-orbiting spacecraft for a six-hour period centered at the NMC synoptic time of 0000 GMT. The actual orbits were taken from one day between 2100 GMT and 0300 GMT. The afternoon spacecraft (NOAA-7) soundings are displayed with an "X" and enclosed in a solid line. Each orbit produced about 600 soundings with 15-layer mean temperatures, 3-layer precipitable water values, a total ozone value, tropopause parameters, and a cloud cover estimate in each sounding.



ONE-POLAR SOUNDINGS
FOR 12Z MAP

Sounding coverage from one polar-orbiting spacecraft for a six-hour period centered at the NMC synoptic time of 1200 GMT. The actual orbits were taken from one day between 0900 GMT and 1500 GMT. The afternoon spacecraft (NOAA-7) soundings are displayed with an "X" and enclosed in a solid line. Each orbit produced about 600 soundings with 15-layer mean temperatures, 3-layer precipitable water values, a total ozone value, tropopause parameters, and a cloud cover estimate in each sounding.



TWO-POLAR SOUNDINGS FOR 12Z MAP

Sounding coverage from two polar-orbiting spacecraft for a six-hour period centered at the NMC synoptic time of 1200 GMT. The actual orbits were taken from one day between 0900 GMT and 1500 GMT. The afternoon spacecraft (NOAA-7) soundings are displayed with an "X" and enclosed in a solid line. The morning spacecraft (NOAA-6) soundings are displayed with an "0" and enclosed in a dashed line. Each orbit produced about 600 soundings with 15-layer mean temperatures, 3-layer precipitable water values, a total ozone value, tropopause parameters, and a cloud cover estimate in each sounding.

Senator GORTON. And how important is data from those particular segments to the function of the satellites?

Dr. CALIO. Well, to those particular areas, extremely important. From the standpoint of total global coverage, it does not affect the input to our forecast models. In other words, one satellite can provide sufficient data to initialize the running of our models, which provide a global characterization of the circulation systems.

Senator GORTON. What is the risk of that one satellite going out of commission? You know, how high a degree of reliability do they have?

Dr. CALIO. The design life of the satellites is 2 years. Of the civilian polar satellite that is currently flying, most of them that have been launched successfully and have lasted in excess of 2 years. The straight scientific probability for a satellite failure prior to 18 months is 0.09, which is very small. The probability of a satellite failure prior to 30 months, though, grows to 0.3. So there is a reasonable probability that beyond a 24-month time frame we will indeed have a failure of a satellite.

Senator GORTON. How does this program relate to the other satellite program?

Dr. CALIO. They are quite complementary. They have entirely different tasks. And it is still our intent to maintain a two-GOES satellite system.

Senator GORTON. Is the GOES program hurt if the polar program is hurt: If, for example, you had a failure of your single satellite?

Dr. CALIO. If we had a failure of the single satellite? No: GOES data collection is entirely separate and distinct. It feeds different types of information to the Weather Service. What would happen in the case of a failure of a single polar orbiter? If the only polar satellite were lost, then the data required to initiate the models to provide guidance to the local forecasters would be seriously degraded. The NWS global forecasts and forecasts out to 10 days depend upon data from orbiting satellites.

I could not quantify the impact but it would have a significant effect on our NWS forecast capability.

Senator GORTON. Thank you, Mr. Chairman.

Senator SCHMITT. Thank you, Senator.

In that regard, does the TIROS system have any single point failures with respect to tape recorders or other——

Dr. CALIO. Tape recorders, we have a bank of five double tape recorders back to back. As far as other single-point failures are concerned, the NOAA polar spacecraft is the same spacecraft that is used by the Defense Military Meteorological Service, so there is redundancy in the spacecraft system, however, not in the instrument payload.

Senator SCHMITT. Do you have mission rules that determine whether or not, if an instrument goes out, whether or not you launch another satellite?

Dr. CALIO. Yes; the civilian satellites are used primarily for sounding data. And if our sounding instruments go out, then we have the ability to call up a replacement satellite. Our current arrangement with the Air Force on launching is—what, 120 days? Approximately 120-day callup to be able to launch a stored spacecraft.

Senator SCHMITT. Does the lack of a second satellite, since it does affect equatorial monitoring mostly, significantly affect your hurricane predictive capacity?

Dr. CALIO. That is the difference between the GOES and the polar-orbiting satellites. The polar-orbiting satellite primarily contributes to temperature and pressure soundings. The geosynchronous satellites (GOES) track the onset of hurricanes and their development as well as other severe storms.

So in hurricanes and tornados and other kinds of storms of that nature, we do most of our diagnostic work for the United States using the geosynchronous satellites.

Senator SCHMITT. But do the temperature and pressure soundings not have a lot to do with your longer term forecasting of hurricane potential energy and so forth?

Dr. CALIO. That information is fed into the forecast models. Yes: sounding data is used by NWS for our 48-hour forecasts, which we try to reinitialize every 12 hours. The polar system reduction would have an effect on those. And thus, with one satellite, it is more important that we make sure that those initialization measurements do occur every 12 hours.

Senator SCHMITT. Well, would you, with only one satellite, then have to be more conservative in your estimates of the energy or the consequences of a hurricane going ashore in terms of its energy content than you would without it?

Dr. CALIO. I am not familiar, Mr. Chairman, with the formulation of the models.

Senator SCHMITT. Maybe you could give us a little bit of information for the record on that, Tony.

Dr. CALIO. I will be happy to do that.

Senator SCHMITT. Do you see what I am driving at? Whether or not you would have to ask the population to assume the hurricane was far more serious than you might if you had more data.

Dr. CALIO. Yes; But I think primarily that the information comes from the geosynchronous, but we will provide that for the record. I do not know the models for those forecasts characteristics in the Meteorological Center.

[The following information was subsequently received for the record:]

When a hurricane, or tropical storm, is within 500 nautical miles of landfall, hurricane reconnaissance aircraft are deployed to gather wind, pressure, and temperature measurements in the vicinity of the storm. Vertical soundings of pressure and temperature are made concurrently with these observations.This collection of data is gathered to accurately assess the intensity of the storm and is incorporated into the analyses used by the numerical prediction models. As the storm nears shore it is reconnoitered continuously. The hurricane forecaster has these observations, as well as estimates based on satellite imagery and observations of opportunity. The reduction of polar orbiter observations will not force, or require, that the intensity of the storm be overestimated in order to galvanize the populace into action.

Senator SCHMITT. More generally, again, what kind of balance has NOAA established between research and development and its operations within the total NOAA missions? Have you tried to establish any kind of balance?

Dr. CALIO. I can tell you where it is right now. We have about 15 to 20 percent of our effort in research and development, about 70 percent of it in the services. And our assessment is, of that amount in research and development, approximately 80 to 90 percent of it is done in-house. That is the status right now.

Our assessment, John Byrne's and myself, is we would like to see the in-house, out-of-house ratio changed. We would like to see more involvement by the university community in a way that not only helps us solve technical problems but in a way of looking at what problems should be solved that would be in the best interests for the operational side of NOAA.

And we think, second, that the balance is about right: about 20 to 25 percent of our effort should be in research and development. But we would want to change the mix of in-house, out-of-house.

Senator SCHMITT. How does the university community feel about that?

Dr. CALIO. About greater involvement? I would think that would be viewed with open arms. I think they would like, from an atmospheric standpoint, to get more involved in the details of our activities.

And as far as the ocean community is concerned, we just started to get some interest, as you know, from the physical oceanographers. And I think they would welcome the opportunity to contribute to a better understanding of what is happening to the oceans.

Senator SCHMITT. Do you have internal scientific advisory committees that you work with on a regular basis?

Dr. CALIO. If you are characterizing that the way we did it in NASA, no. They do not exist the same way. There are advisory functions that take place. We work closely with NACAO, National Advisory Committee for Atmosphere and Oceans, which is a separate entity. They operate more like the National Academy to NASA in looking at the overall strategy and policy issues.

Internal ad hoc peer review does not exist today at NOAA.

Senator SCHMITT. Have you contemplated that along the lines of the advisory panels that serve, say, the associate administrators of NASA?

Dr. CALIO. Yes, I have.

Senator SCHMITT. What has been your conclusion? It has merit and worth further study?

Dr. CALIO. I think it has merit. And I think those kinds of things should be implemented. It takes time for our staff to be able to work those arrangements out within the NOAA structure. I am looking forward to being able to do that in the future. I think it is absolutely essential. That is my personal opinion.

Senator SCHMITT. Senator Gorton.

Senator GORTON. No further questions.

Senator SCHMITT. Another busy day in the U.S. Senate.

Can you describe the current relationship—I am sure you can—would you describe the current relationship between NASA and the Weather Service and EDIS and other relevant agencies within NOAA, and then basically what general organizational changes you anticipate?

Dr. CALIO. Let me start out with the National Weather Service [NWS]. NWS is the element within NOAA that provides a forecasting capability at the onset of severe storms plus other weather conditions. Their purpose in life, of course, is to be able to protect life and property. They use many different tools to develop each forecast. So NOAA's satellite component provides support services to the National Weather Service, as well as many other satellite data users.

Data acquired from the satellite service then is analyzed by the National Weather Service in order to come up with their forecasting guidance to the field. Additionally, the data from the satellite service is also archived in the Environmental and Information Service, where they, in turn, look at that data from the standpoint of archiving it and distributing it to the appropriate public and private sector elements. That is the way those 3 entities operate within NOAA.

In our efforts to restructure in the near future, we plan to put all the atmospheric service activities together, the National Weather Service, the National Data Buoy Office, and the like, into one entity for providing atmospheric services to be supported by a research and development arm. And second, to put together the National Earth Satellite Service and the Environmental Data and Information Service together, so that we will have in that group the capability to archive, reformat, expand, and extract information from that data source and distribute it to the general public.

Am I making that confusing for you?

Senator **Schmitt**. No. I am just trying to sort out, basically separating activities that provide an ongoing forecasting service from those that provide ongoing longer term information services.

Dr. **Calio**. The Weather Service uses the National Environmental Satellite Service [NESS] and EDIS as a tool to help accomplish its mission. EDIS and use satellites as a tool with regard to forecasting. The primary purpose of EDIS and NESS is to support the Weather Service. Climatic assessments are conducted currently in the Environmental Data and Information Service which give us an historical perspective of what has happened in the weather over the past year or so, and they essentially make assessments of what that means from the standpoint of energy consumption, agricultural productivity, and the like, which are pure assessments. That is not a prediction of what the climate will be. And those have turned out to be extremely useful and fruitful to the industry at large to use them.

Do you have any comments to make on that, Margaret?

Ms. **Courain**. No.

Senator **Schmitt**. It would be in the second category of activities that your climatic analysis and forecasting efforts, such as they may be, would be contained; is that correct?

Dr. **Calio**. Yes. NOAA's climatic activities will be contained in the new National Environmental Satellite and Data and Information Service [NESDIS]. The climate activities would be in NESDIS as far as NOAA's climate research is concerned.

Now, NOAA still has the responsibility for conducting a national climate program. And for the next year, that activity, coordinating the efforts of other agencies at a national level, will occur directly at the administrator's level. We have just recently brought in Dr. Allen Hecht, who will manage that program and report directly to Dr. Byrne for the next year or so.

Once we seem to have the national coordination activity pulled together, then we will look at the advisabilty of merging the NOAA program with NESDIS. We are not certain that that is the right thing to do at this point in time.

Senator **Schmitt**. Now, your oceans programs are a separate group entirely?

Dr. **Calio**. Yes. Looking ahead, what we are trying to do in the oceans programs is, if I can say, taking the activity that we have responsibility for in the nonliving marine resources, if you will, ocean mining, coastal zone management, ocean pollution, charting, cartography, mapping, and geodesy and putting that together in a single element to form the nucleus for our national ocean services.

But, you see, it lacks one very important element; namely, oceanography—physical, chemical, and biological and marine oceanography. We would like to see that strengthened over the coming years.

The living marine resources would still reside in the element called National Marine Fisheries Service.

Senator **Schmitt**. So you are really looking at four major components of the programmatic activity of NOAA; is that correct?

Dr. CALIO. Actually, for now it breaks out into five, because of—I think that is correct. There is the National Oceans Service, of all those I just described. Its companion element, the National Marine Fisheries Service. Then there is the National Atmospheric Services or National Weather Service, the National Environmental Satellite and Data and Information Service, and then the research and development component which is the support activity which cuts across all of those other major line components. So those are the five elements.

Senator SCHMITT. Is it in the R. & D. element where you would expect to see longer-term in-house coordination of the activities of——

Dr. CALIO. That I referred to earlier?

Senator SCHMITT. Of the four agencies.

Dr. CALIO. Yes. They are longer-term, and you come right on the nub of a very difficult management problem as to how we manage the research and development. The very short-range has to be a part of the ongoing operational elements for them to do their own research and development, to bring new capabilities on line.

The longer-range—and I hope you do not pin me down on time as to what longer-range is—would be done by that research and development activity. That is where the university community can interact in a very positive way, in which we would hope to see a greater involvement, drawing on the creativity of the university complex in the research and development, the latter.

Senator SCHMITT. There is a great deal of obvious synergism between the four major elements that you described. How do you insure that that potential synergism does occur? I mean they are all dealing largely with the Earth as a solar engine, if I may use the term. They just look at different aspects of it and different consequences of environmental interactions in the oceans and the atmosphere. So how do you insure that there is that necessary synergistic activity between the agencies?

Dr. CALIO. For one thing, it comes with the incentive and the interest on the part of the first-line management that they have to have and feel a strong interest in a national atmospheric and ocean service capability, a NOAA, if you will. And I think we have that in the interest of the individuals. As we develop programs along each of their own elements, we are trying to cross-fertilize some of those activities so one element is dependent upon another.

Let me see if I can take an example there. The National Marine Fisheries Service has the responsibility for habitat protection, endangered species, and the like. And yet the new National Oceans Service would have the responsibility for understanding ocean pollution. Those two are forced together. They would have the responsibility for ocean mining, and the associated regulations requiring the participation of both of those two.

If you look at it from the standpoint of understanding the physical ocean, the data required to understand or describe sea states, wave height, wave spectra, sea surface temperature, there is an important cross-correlation between the Weather Service the Satellite Service and the National Oceans Service.

So there is a cross-correlation even though there is a central focus in each of the major elements. Those major elements need their sister organizations, if you will, to get their work done. And then finally you have been in the program management business, you know, it is a question of who holds the gold rules. So it is a question of trying to put the financial resources in the right place to be able to get cross-correlation, so you can bring the physical facilities and personnel together in one place with the money in the other place to get the two to work together to carry out a program successfully.

Senator SCHMITT. You have regulatory activities in several of these groups; is that not correct?

Dr. CALIO. Pardon me, sir?

Senator SCHMITT. You have regulatory responsibilities in several of these groups; is that correct?

Dr. CALIO. In the fisheries and the oceans group we will. In the weather, I am not familiar with any there. I would have to go back to the record and look at that.

Senator SCHMITT. I do not think there are.

Dr. CALIO. Nor in the Environmental Data Services. So I think it is primarily in the marine area. The majority of the regulatory functions are in oceans and marine fisheries. The other areas, for example, in the Clean Air Act and the like, we provide a service to EPA in giving them assessments of the effects on the atmosphere.

Senator SCHMITT. Tell me—I am sure you have heard my assessment that it is next to impossible to mix research and development and regulatory activities within the same organization, whether it be NOAA or a part of NOAA—why do you think that NOAA can survive where other agencies have not in this kind of a mix, the problem being that regulatory activities almost invariably take most of management attention? Plus, it creates suspicion within the same group of people that you are trying to work with in research and development.

Dr. CALIO. Well, that is a two-edged sword, because it also takes knowledgable people to implement appropriate regulations. And with that, it requires the fundamental knowledge of what it is you are trying to regulate. So how do you separate those two important elements, knowledge and understanding of the environment, the resources we are living in.

Senator SCHMITT. That is the usual argument. But I will tell you, experience is in spite of the merits, some of the merits of that argument, the suspicions generated, as take, for example, in EPA, with EPA it has made it very difficult for EPA or the Department of Transportation or the AEC, now DOE, to have generated the kind of research and development that we expected them to undertake, because there was the suspicion and there is the suspicion that that is geared toward enhancing the regulatory activities rather than enhancing the overall pursuit of knowledge, technology.

The track record is not very impressive, and that is why I think you have a very difficult path out ahead of you.

Dr. CALIO. I have to agree with that. I think it is a very difficult management problem because no matter how you separate it out organizationally, those problems do not go away that you just described.

As far as management attention is concerned, it is an interesting observation, only being on this job a short period of time, that a tremendous amount of our potential goes into those regulatory functions as opposed to the management of the day-to-day activities in making sure that the right base is in place.

As a matter of fact, that is pretty much the way Dr. Byrne and I have separated our tasks. John is involved more in the policy and overview of the agency, where I am involved in the day-to-day implementation or functioning of the agency. I get less involved in the regulatory functions than John does. But it does consume a tremendous amount of time.

Senator SCHMITT. Are you assuming that you will be able to provide, you personally will be able to provide, the kind of managerial oversight of the research and development activities to insure that that longer-term view is held by the agency while it does deal with the day-to-day brush fires?

Dr. CALIO. With the support of the staff, that is my intention. I still do not think it is going to protect us from the slings and arrows of the driver for regulatory activities and from criticism as to whether we can really regulate on the one hand and provide the appropriate research base on the other to understand what is going on in that particular environment.

Senator SCHMITT. All right. On another general issue, as I recall, the old Coast and Geodetic Survey was integrated at one time, was integrated into NOAA in 1970; is that correct?

Dr. CALIO. That is correct.

Senator SCHMITT. And with it was the early——

Dr. CALIO. 1965.

Senator SCHMITT. I lose track of time.

Dr. CALIO. Although it has existed since 1837 or something of that sort.

Senator SCHMITT. And with that there were also some earth-science responsibilities, solid earth-science responsibilities. Now refresh me, they have all been redistributed now out of NOAA into the USGS?

Dr. CALIO. There are two parts. What you are thinking of——

Senator SCHMITT. You used to have——

Dr. CALIO. The seismic group is in the USGS. There is still the Geodetic group in NOAA. They are still a part of the National Ocean Survey and still work in cooperation with NASA, National Science Foundation, USGS and other elements of NOAA, in trying to establish the appropriate data for geodetic research and actually doing the survey for geodetic data.

We also, through the Environmental Data and Information Service, provide the central repository for geophysical data, whether collected by NOAA or by the U.S. Geological Survey or by others at our Boulder facilities in the environmental research facilities at Boulder, Colo.

We actually archive and disseminate survey data from that original element, the seismic group that once was with NOAA and is now in the Survey.

Senator SCHMITT. Well, with all of that in mind and the general dissatisfaction that prevails at this time with the way FEMA and its associated agencies are handling the earthquake hazards program, it has been suggested by not a few that maybe NOAA, with that base plus the tradition of forecasting, might be the appropriate lead agency for earthquake hazards prediction and mitigation. How do you react to that?

Dr. Calio. I think our friends in the Survey might have something to say about that.

Senator Schmitt. Well, the Survey is a research arm, and we have done something about making the geological division research by separation of the energy—well, anyway, whatever the group, the old conservation division out of there.

Dr. Calio. Yes.

Senator Schmitt. But independent of that, do you think NOAA could handle that task? It is certainly compatible with their present activities: forecasting, data collection, forecasting based on data collection.

Dr. Calio. Generically, you are correct as far as the specialists. I think the number of specialists that would be required I do not think currently exists within NOAA.

Senator Schmitt. But there is nothing inherently incompatible in that kind of scientific and forecasting activity with what NOAA currently undertakes, is there?

Dr. Calio. No; that is correct. But we would have the same problems, though, that the previous one—as we—well, not exactly.

Senator Schmitt. Well, you can think about that. And maybe when we have our next hearing, you and Mr. Byrne can talk to us about that.

Dr. Calio. All right.

Senator Schmitt. Just some food for thought, because I will tell you, the present earthquake program in this Government is a shambles, and I cannot believe it would be any worse if it was back into NOAA.

Dr. Calio. It is interesting because——

Senator Schmitt. I am not talking about the research side of it. There is not enough going on. But, boy, the application side of it is ridiculous.

Dr. Calio. That would make some of our people very happy, I am sure. The interesting part of it is we are trying to work extremely closely with the U.S. Geological Survey. We have resurrected our coordinating activities between ourselves and the director of the Survey, and we are trying to strenghten both organizations with the limited resources that we have.

As to whether we could take on a subject like that or not is something we have to give some careful thought to.

Senator Schmitt. I would hope you would.

So you want to make some general comments now about the satellite program, Tony?

Dr. Calio. We have been into a number of issues. Let me, if I may, just skim through this. Senator Gorton has already hit one of the major issues; namely, the one-to-two polar-orbiting satellite system proposal contained in the fiscal year 1983 budget. That is one that I think ought to be fairly well understood by this committee. I hope I have answered your questions satisfactorily. My written statement which I will submit for the record explains the issue in detail.

With respect to the budgetary information, all of that information, I think all of that data is in the budget books, and I would not want to spend any time on that now unless you have any specific questions.

The geosynchronous satellites, the important thing I would like to bring forward there is that thanks to our colleagues at NASA—and I say that to those NASA people who were responsible for it in the development of the atmospheric satellites, the geosynchronous satellites—I think we are going to see a tremendous improvement in our ability to predict the onset of tornados and other severe storms because we now have the overall perspective from those geosynchronous satellites to see the instabilities taking place in the atmosphere and to be able to concentrate on those and to be able to forecast their occurrence with increasing warning time for those involved.

With respect to LANDSAT, I guess that is one that would also be of interest to you. We are moving along to incorporate into our activities taking over the operation of LANDSAT by January of 1983. It looks like NASA is moving toward a successful launch of LANDSAT-D in July of this year.

And the arrangements between ourselves and the EROS·Data Center for the U.S. Geological Survey out at Sioux Falls and Goddard have all been put together, and we are on schedule for taking over that activity.

The major difficulty at the present time is getting enactment into law of interim LANDSAT authorization legislation submitted to Congress May 5, 1981 and updated to reflect fiscal year 1983 budget figures March 1. Approval of the legislation would allow NOAA to operate the LANDSAT system and more importantly to charge user fees to recover costs for the maintenance and operation of the LANDSAT facilities.

I think the only other thing, along with LANDSAT, is that the Cabinet Council on Commerce and Trade [C.C.C. & T.] is meeting April 22 to try to come to a conclusion as to what should happen to LANDSAT in the future.

I think you are familiar with the two questions posed to the Cabinet Council for Commerce and Trade. One was, what is the best mechanism to implement the policy of transfer of civil land remote-sensing systems to the private sector, as soon as possible. And the other is, should we simultaneously transfer to the private sector both civil weather and land remote-sensing systems. That will be addressed by the C.C.C. & T.

Those two issues will be addressed, and I hope we will see a decision made there. And as soon as that is done, we would be very happy to come back and talk to you in the Congress about those decisions.

I think those are the major elements we have talked about. The reorganization and——

Senator SCHMITT. Tony, what is the current relationship that you have with NASA regarding new-generation spacecraft and new instrument development?

Dr. CALIO. OK, that is a good point. That is one that I did miss. There are two elements to·it. Up to this year, this year being—excuse me, up to the proposed year fiscal year 1983, we had—there was in the NASA line an element called "operational satellite improvement program," where NASA would request funds and provide the necessary developmental work to give NOAA improved instruments that they could use in their operational satellite system.

Beginning fiscal year 1984 that activity will no longer be funded by NASA and we in NOAA then would have to budget for that activity in the future. And if we wanted NASA to do that work, which we wish they would, then we would have to reimburse NASA for that activity.

So it is a question of funding source, not a willingness on the part of NASA to do the job. These are tight times, and they are concerned about their own research and development. If we want them to do research and development, whether it is for an improvement of operational satellites or new sensors or satellites—that is the second part of it, any block changes to satellites in the future—NASA would be requesting that NOAA also pay for the developmental costs for those new satellites in the future.

That is a change in the way we have operated over the past 15 years.

Senator SCHMITT. And that will begin in fiscal year 1984?

Dr. CALIO. Yes, sir.

Senator SCHMITT. Senator, please go ahead.

Senator GORTON. I do not want to interrupt your——

Senator SCHMITT. I just have one final question on the TIROS system. I presume you are going to the one-satellite system primarily for budgetary reasons, the cost not justifying the added benefit of coverage?

Dr. CALIO. As you are familiar, it is a risk versus dollars issue.

Senator SCHMITT. Does this affect any international agreements in terms of what we have agreed to provide the World Weather Watch or other activities?

Dr. CALIO. No, as far as agreements are concerned. It will affect the quantity of data provided. There will be a reduction in the frequency of polar-orbiting imagery available through the automatic picture transmission, the APT. But you are absolutely right, our prediction is we would save $271 million through 1992 by the reduction or elimination of one satellite in orbit.

Senator SCHMITT. Senator Gorton.

Senator GORTON. At one point in your testimony you talked about the uses of satellite remote-sensing capabilities for fishing or fisheries management. Can you give me any detail on the specific services that are offered and to whom and whether this budget will continue them?

[The following information was subsequently received for the record:]

The National Marine Fisheries Service (NMFS) continued to use the Remote Access Measurement System on Nimbus 6 in tracking studies of adult loggerhead turtles. These experiments were terminated prematurely in September 1981 because the tape recorder system on the spacecraft failed. Only one significant problem was found in using satellites to track sea turtles, and that was in the visual orange paint used on the transmitters. In one documented instance a fisherman, seeing the brightly painted transmitter, chased and caught the tagged turtle, removed the transmitter, and released the turtle. A dull gray paint is now being used. Success of these experiments has prompted redesign of the transmitters for use with the NOAA Argos tracking system. Two prototype systems will be field tested in 1982. These systems are about one-fourth the size of the Nimbus 6 transmitters and will operate for one year.

The first NMFS satellite data processing and analysis system was installed at its Bay St. Louis, Mississippi facility of the Southeast Fisheries Center through a cooperative effort with NASA. Software, originally designed for Landsat data, was updated to process Nimbus 7 Coastal Zone-Color Scanner, GOES, and NOAA temperature data. The system already has been used in a fisheries study by the University of Michigan and will be used in cooperative studies with the Northeast and Southwest Fisheries Centers, the State of Louisiana, U.S. Fish and Wildlife Service, and NASA.

A study was initiated to develop ways to establish relationships between the extent and character of coastal wetland ecosystems and the health and productivity of recreationally and commercially valuable living marine resources. The study is being conducted cooperatively between the Northeast and Southeast Fisheries Centers and with NASA and the State of Louisiana. The study will concentrate on marsh areas in Louisiana, using Landsat data to monitor changes in wetland ecosystems.

Operational products were developed using Seasat wind data as input to a Gulf of Mexico surface transport model. Examples of these products are the inventory of available data, the display of wind vectors, and the derivation of wind-induced properties of ocean circulation in the Gulf. Model products such as wind-driven currents and transport and upwelling areas provide special capabilities for fisheries applications particularly in the dispersal mechanisms for planktonic organisms. Ocean current data are used to show trajectories and establish time requirements for passive life stages to drift from one location to another. Seasat provided new technology for fisheries applications to monitor, model, and predict pathways by which offshore spawn of estuarine dependent shellfish and finfish find their way into coastal nursery grounds.

An objective of NMFS is to achieve a zero net loss of habitat and productivity for critical living marine estuaries and anadromous species by 1985. Using Landsat data the Northeast Fisheries Center (NEFC) developed the plan and implemented the Coastal Habitat Assessment and Research program to quantify changes in productivity, biomass, and areas of principal coastal zone habitat types from North Carolina to Maine. The program will proceed in three phases: Phase 1 will determine how many acres of wetlands exist and what vegetation types they contain; Phase 2 will determine how many acres of wetlands have been lost or gained in the past ten years; and Phase 3 will determine how the value and quality of coastal habitat is changing based on biomass and other properties.

NEFC also participated with the NASA Langley Research Center in the Nantucket Shoals Experiment and the planning of the National Science Foundation warm core-ring studies. The objective of the Nantucket Shoals Experiment was to use shipboard, in situ, and aircraft and satellite remote sensing techniques to investigate the distribution and abundance of phytoplankton on the shoals in relation to rates of nutrient supply, growth, vertical mixing, and advective processes. The objective of the warm core-ring studies is to enhance the understanding of physical, chemical, and biological processes related to Gulf Stream warm core-rings. NEFC is augmenting this experiment by studying the shelf-slope interface. To support these activities NEFC is building a High Resolution Picture Transmission system in cooperation with NASA Goddard.

The Northeast Area Remote Sensing System (NEARSS), a new regional capability to receive and use remotely sensed data, consists of five elements. These are: receiving system, processing system, a data-retrieval service, a regional communications net, and user services. The development of NEARSS is guided by an association of users whose charter members are university and government agencies. NEARSS is presently in the development stage.

The application of satellite observations in marine fisheries research and management is being evaluated in studies at the Southwest Fisheries Center (SWFC). Using satellite thermal infrared images and extensive sampling for northern anchovy eggs and adults, it was found that no spawning occurred over large areas of the coastal ocean off California during the peak spawning period. In this study only satellite data provided fishery scientists with a synoptic picture of the large scale oceanographic events happening over the entire anchovy area during the peak of the spawning season. Other studies indicate that oceanic boundaries, which are important in determining the distribution and migration patterns of albacore tuna, can be detected and monitored using satellite thermal infrared and ocean color images.

Dr. CALIO. OK. Most of that work, I believe, is experimental in nature right now. There are two types of data that are obtained from satellites. One is with an instrument that is called a coastal zone-color scanner [CZCS]. It looks at the phytoplankton that is brought up on the surface of the ocean, as well as particulate matter, and it distinguishes by looking at the color variation of the surface whether we are looking at clear water or turbid water or water with nutrients in it and the like.

The distribution of that information on the surface of the ocean is extremely useful to our national fisheries people. That is one element.

The second element——

Senator GORTON. Who then turns it over. It is then available to people who are in the business?

Dr. CALIO. Yes. I am trying to think how that is disseminated to the fishing industry. Is that done through any kinds of advisory service?

Ms. COURAIN. Well, there are direct regional centers where National Marine Fisheries shares the information on that particular area. So it does get to the fishing industry, yes.

Senator GORTON. Please go on.

Dr. CALIO. I want to come back to that in a minute, because there are—well, let me get to that right now, because the same will apply for this next source of data. There are industries, however, who can take this raw data product, if you will, and provide special thematic information to the fishing industry, which we will call an added value industry. That could be a service industry also to the fishing industry, and does exist, for example, on the west coast, as you are probably familiar.

All right. The second data source is the sea surface temperature [SST]. That is derived from our polar orbiting satellites, also providing thermal maps which are useful for the fishing industry. And that is also provided to our marine fisheries service. So those are two basic measurements that are provided.

Senator GORTON. Is there money in your 1983 budget request for this, and are you considering user fees in connection with the dissemination of any of the information?

Dr. CALIO. So this is still an experimental effort, I believe. Let me check that for sure.

I am getting positive on all of those, no user fees and there are sufficient funds to conduct that activity at the present time.

Senator GORTON. Another subject, on page 15 of your testimony you mention that polar satellites provide certain observations in support of shipping. What kind of services? What would the shipping companies or commercial organizations utilize that information for?

Dr. CALIO. Well, sea-surface temperature, for one thing, is important because we can delineate, for example, where the Gulf Stream is, and as it meanders through, undulates through from time to time. So in mapping the routes for the ship, it is extremely important to know where they cross that Gulf Stream. It is important for them from the standpoint of fuel consumption. Ice determination, where the leads are, where the open ice is, is again of interest to the shipping industry.

Senator GORTON. And again, this is information which is then made available to the shipping industry to the extent——

Dr. CALIO. Through the National Weather Service, that is correct.

Senator GORTON. And I assume your answer to the other questions would be the same. You can continue it and it will not be a user fee type of service.

Dr. CALIO. At the present time. The reason I say at the present time is, we are looking at our entire structure from the standpoint, as I tried to say in the opening part of my comments, what portion should be in the public sector, what part should we be reimbursed for because we are producing tailored products, and what part should we not be in at all because there are industries out there who can indeed operate on these raw data products and produce a very special product for a specified industry at a specified cost.

So we really have to unravel those three parts over this next year or so.

Senator GORTON. One more set of questions, and I am now on page 29 of your testimony.

Senator SCHMITT. Would the gentleman yield just on this past subject?

Senator GORTON. Sure.

Senator SCHMITT. 120 days, if that is the time on call for replacement satellite——

Dr. CALIO. Yes, sir.

Senator SCHMITT [continuing]. Could be a very expensive period of time for those industries that are dependent on that satellite data.

Dr. CALIO. Well——

Senator SCHMITT. And not just the industries, but other economic and human activities that might be left blinded, more or less, during that period of time, not entirely blinded, but——

Dr. CALIO. Yes, OK. That is why I gave you the probability numbers. The design life of the polar orbiter is 24 months. Several have lasted 24 months or longer. That is why we went to the 18-month callup and launch of the replacement satellite, so that should we fail in that launch, which we have in one—NOAA B was an unsuccessful launch—we still have roughly 5 months before we reach the design life of the in-orbit spacecraft with a spare.

You know that business better than I do, that we still have a finite probability that we can indeed lose that satellite in orbit at less than the 24 months for which it is designed. So there is a risk versus cost.

Senator SCHMITT. Has that analysis been done in some depth of detail?

Dr. CALIO. Not in the pure sense of probability versus dollars saved as to what is the impact of—you know, what could the impact be, because you would have to go through quite an analysis of all the using industries should we be without a polar orbiting satellite for a period of, say, 6 months.

Senator SCHMITT. What was the decision based on, other than a way to cut some money out of the budget?

Dr. CALIO. Well, we can operate—we can operate and the probabilities are high enough for success——

Senator SCHMITT. Yes, but if you do not know the cost of those probabilities not being borne out, it is a little hard to make a decision.

Dr. CALIO. Well, but OK. Those are——

Senator SCHMITT. I understand what you are saying. Like we went to the moon on four-nines. The probability that there would be no catastrophic failure that would result in the loss of the crew was pretty comforting, but that one catastrophic failure had a certain price attached to it. We chose to bear that price, everybody did, the entire organization.

But it is still a good idea to know what you are dealing with in economic terms, in economic and human terms, just what you think that price is.

Dr. CALIO. I gave you a 0.3 probability for 3 years.

Senator SCHMITT. But that is the probability. What is the cost?

Dr. CALIO. We did not have a cost figure associated with it.

Senator SCHMITT. That is it. You might think and see if there is any way to do back of the envelope estimates, even from one or two industries. Just take a major user and if you can show that 120 days is inconsequential, great.

Dr. CALIO. You have to segregate it out, though, because the Weather Service would still be able to operate. There would be some degradation in forecast accuracy. What you would lose is some of the byproducts that we were just on, such as the phytoplankton, such as sea surface temperature and things of that sort that might directly affect the fishing or shipping industry.

Senator SCHMITT. Sorry to interrupt.

Senator GORTON. That is all right. Thank you.

In your statement you have a brief description of a search and rescue program in which you plan to participate for the next 15 months. How will you coordinate that with our Coast Guard? Has it been a part of the planning of the project itself? And is any followup plan—has any followup plan been adopted for after the 15-month experiment is over?

Dr. CALIO. Let me start it and I will ask Dr. McElroy to answer the last part. The first part is, within the United States there has been a coordinated activity for about the past 5 years between the Department of Transportation, Coast Guard, the Air Force, and other elements of the Government—NASA, NOAA—to try to bring about this search and rescue experiment.

We came together with a consistent and an integrated set of American objectives, formed an agreement in association with Canada and France into a three-way, three-nation activity, where we would provide the spacecraft, France and Canada would provide instruments on board that would detect the transmission from the emergency beacons from the surface and process the data and carry it and connect it worldwide.

Then the three of us, France, Canada, and the United States, went with a cooperative agreement with the Soviet Union, so that we developed a system that was interoperable. We can operate with each other, but yet we are not truly dependent on one another, so either if we fell down or the Soviets fell down the others would still be able to go forward and provide a 15-month experiment to demonstrate the utility of this concept.

That is where we are today, and we are looking forward to a launch in the early part of 1983 for the U.S. satellite. And I believe the Soviets plan to launch their spacecraft this summer.

With respect to future plans, let me ask Dr. McElroy to talk about that in more detail.

Dr. McElroy. We are continuing to explore in the international forums that are open to us—for example, INMARSAT or any other routes that may be available—how we might arrange for a continuation of the search, and rescue, program after the initial experimental period.

Now, as we look to the way we switch from two polar orbiters to one polar orbiter, we will have search and rescue packages basically available on satellites out through this decade. And the Soviets, if they live up to the agreements they have made with us thus far, would have complementary packages.

So that is some 8 years, roughly, to evolve an international system, an internationally funded system. So that is—we do not know exactly what—how that will evolve. We have time, we believe, to make it happen.

Senator Gorton. Thank you.

Senator Schmitt. Thank you.

It is my understanding the Soviets have not lived up to part of their agreement.

Dr. McElroy. In search and rescue?

Dr. Calio. In search and rescue, they are there.

Senator Schmitt. In the geostationary meteorological satellites?

Dr. Calio. No; they have not.

Senator Schmitt. Is there any particular reason for that? They just got tired of the whole deal?

Dr. Calio. No; I think they are still trying to develop a geosynchronous satellite. At least that is the way the discussion is going in the international arena.

Do you want to add anything to that?

Mr. McElroy. You might note, Senator, that an Indian satellite was recently successfully launched into almost the identical location that the Soviets were going to place theirs, in any event. So now with the Indian satellite up there, the effect of the lack of the Soviet satellite is considerably less than it was before.

The Soviets are still planning, according to the dialog that they have had with us, to launch in the 1983 time period. But as you say, they have been promising since about 1978 on an annual basis to launch.

Senator Schmitt. Tony, it is necessary for there to be a transfer of data and I guess preprocessed data from the satellite service to the Weather Service, is that correct?

Dr. Calio. Yes, sir.

Senator Schmitt. Does that cause any difficulties within this new organization that you can foresee?

Dr. Calio. No. As a matter of fact, that is exactly one of the reasons that we have merged the EDIS and NESS together. There is spacecraft management capability, there is the whole number-crunching part of extracting useful information out of the data. We have put that all together in the NESS-EDIS merger and provided finished data products then to the National Weather Service and other NOAA components.

To my knowledge, though I am not completely sure, but to my knowledge there is no problem with that whole process. It has worked extremely well with the National Meteorological Center, with the severe storms forecasting centers, and all of the other organizational elements within the Weather Service.

Senator SCHMITT. If requirements for data change, is there a normal process by which those get considered fairly rapidly and then agreed to? Does that involve the Administrator or at what level are those decisions made if the forecasting——

Dr. CALIO. If they were——

Senator SCHMITT [continuing]. If a different type of finished product is required?

Dr. CALIO. That works between the two Assistant Administrators, usually pretty much at their level. We only get involved, or the Administrator only gets involved, when there is difficulty.

Senator SCHMITT. They cannot agree?

Dr. CALIO. Yes. And to my knowledge, the short time I have been there I have not seen any difficulties of that nature at all between the Weather Service and NESS.

Senator SCHMITT. Is NOAA involved technically in Unispace?

[The following information was subsequently received for the record:]

For well over a year, NOAA has participated in interagency preparations for U.S. Government participation in the Second U.N. Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE '82). In preparing for UNISPACE '82, participating countries have been requested to submit national papers outlining their respective space activities. An interagency group has drafted a U.S. National Paper that was submitted to the Secretariat for UNISPACE in March. NOAA had primary responsibility for drafting and coordinating the remote sensing portion of this paper.

In addition, NOAA has been involved in the development of a U.S. conference exhibit. The planned U.S. exhibit will include industry displays and government agency displays. For the government exhibit, NOAA is contributing material depicting our current and future role in providing remote sensing services world-wide. We are also exploring the possibility of additional displays on real-time equipment to demonstrate the capabilities of NOAA's operational meteorological satellites. Plans for the U.S. exhibit are now being coordinated by the Department of State's Office of the Coordinator for UNISPACE '82.

NOAA is also arranging for near-real time transmissions of data from the GOES satellite to be included in the planned World Meteorological Organization (WMO) demonstration at UNISPACE '82. Finally, NOAA has undertaken a joint project with the Department of Satellite Cartography of the Austrian Academy of Sciences which will give favorable visibility to U.S. interactive analysis technology. The project will demonstrate the practical applications of satellite remote sensing data (primarily Landsat).

Based on discussions with the Department of State and Mr. James Beggs, Administrator of NASA and designated Head of the U.S. Deletgation to UNISPACE '82, NOAA expects to be represented on the U.S. Delegation. We understand that currently Mr. Beggs and the White House are considering nominees for membership and will be in a position to announce a final list of delegates in the near future.

Dr. CALIO. Yes. I guess the delegation has not been put together completely, but we are involved and we have indicated our interest and enthusiasm to participate. And as soon as the delegation is put together, we hope we will have representation on it. And Dr. McElroy——

Senator SCHMITT. You hope? You do not know that you are going to be invited?

Dr. CALIO. We have an invitation, but I do not know for sure. And Dr. McElroy is involved in preparing technical material.

Senator SCHMITT. Is that ongoing in anticipation of being a member?

Dr. CALIO. Yes.

Senator SCHMITT. Do you think that you can be ready?

Dr. CALIO. Dr. McElroy says yes. I have received a notebook about 3 inches thick about a week or so ago which is all the preparation material that has been put together to date.

Senator SCHMITT. Well, if you have started thinking about it you are way ahead of the State Department. So at least you are——

Dr. CALIO. We have.

Senator SCHMITT. They were not even going to attend, if you recall.

Dr. CALIO. Yes, I understand, for some different reasons, yes. But as far as I know, the delegation has not been selected yet.

Senator SCHMITT. But you are preparing. Could you provide for our record some general, noncommittal if you wish, summaries of the issues that you will think that will affect your agency the most, that you must be involved in in Unispace?

Dr. CALIO. Yes.

Senator SCHMITT. I do not know why I keep doing this, because the State Department obviously has won every one of these battles, and we will I guess for the rest of my life be Johnny-come-lately in international conferences dealing with science and technology. But we will keep pushing it.

Dr. CALIO. We will provide that.

[The following information was subsequently received for the record:]

In the area of satellite remote sensing, there are a number of issues that have traditionally been disucssed in the U.N. Committee on the Peaceful Uses of Outer Sapce (COPUOS) and will, in all probability, be reflected at the UNISPACE '82 Conference. Some countries have called for the UN to take a more active role in international coordination of satellite remote sensing systems activities. A corollary issue is the desire of some coutnries to consider establishment of internationally-owned and operated remote sensing satellite systems as a way of achieving complementarity and compatibility of systems and long term continuity of data acquisition and dissemination.

A final issue is that of international restrictions on the dissemination of satellite remote sensing data. Some countries advocate consent regimes whereby, for example, a sensing state would be required to receive the consent of a sensed state before data of that country's territory is disseminated to a thrid party. The U.S. has opposed international restrictions believing that open dissemination of data is the best way to ensure that the world comunity shares in the benefits of this technology.

UNISPACE will be used by some countries as a forum to air these issues, and the diversity of views on them will be reflected in the Conference Report which is to be a consensus document. The Conference will, then, provide a perspective on the international context in which future U.S. satellite remote sensing must develop. In addition, however, NOAA views the Conference as an excellent opportunity for U.S. Government and industry to demonstrate their respective capabilities in the area of satellite remote sensing technology.

Senator SCHMITT. Technically, the country does not do bad at all, but politically we are always behind, trying to figure out what in the world the conference is all about and what we ought to be doing there.

What instruments and sensors do the TIROS satellites have that the defense meteorological satellite program do not have on board?

Dr. CALIO. The sounders primarily. The sounding information is of primary interest to us, as I indicated earlier, to collect that data, to initialize our forecast models. Dr. McElroy maybe can give you a more expansive—the DMSP, as John is indicating, is a visual and infrared imagery, where ours is a microwave temperature sounding, and the infrared temperature and water vapor sounding.

Senator SCHMITT. Do you share the data from these two systems?

Dr. CALIO. Oh, absolutely. The information is compared in a series of processing centers between Fleet Numeric in Monterey and up at Air Force Global Weather Central and our activities at Suitland, and we do cross-link all the data products.

Senator SCHMITT. Is any of this data classified?

Dr. CALIO. Ours?

Senator SCHMITT. No; theirs.

Dr. CALIO. I think that is the way it works. What we get from the military services is not classified, so that we are permitted to distribute the data we get from them. I think that is a correct statement.

Senator SCHMITT. Is it classified as collected, do you know? Do they degrade it or——

Dr. CALIO. No; they do not play with it. As far as degrading it is concerned, I think the way they cut out the data sets, I think that is correct—let me ask John to answer that, so we get that right.

Senator SCHMITT. Go ahead, doctor, if you have——

Mr. MCELROY. No. They sometimes fly special instruments on their platforms, obviously which do not intermix data with their basic data stream. So the basic weather data we get are thus totally unclassified, and are simply put out for everyone to use.

Senator SCHMITT. Now, do you anticipate that in the failure of the TIROS satellite, the single TIROS satellite, that you would have some backup capability with weather ships and routine aircraft reconnaissance and so forth, or would you anticipate calling on that in such a situation?

Dr. CALIO. Well, we would anticipate calling on it. You are saying now about the single satellite, if something really would happen there, yes.

I guess I ought to correct a notion that I guess I have been asked several times, that is, if we lose both satellites are we going to be back to World War 2 capability. And you know as well as I that that is not the case, because there have been three, four major advances: the Satellites, computation capability, communications capability, and improvement in ground observations. The latter three will still exist.

In addition, we will collect, you know, the other ground observation data in a much more efficient way than we had at the end of World War 2. So there will be a degradation, but there will not be a total loss. In answer to your question, yes; we will have the conventional data as long as we keep the communication links up in a time frame like that.

We will lose the data that Senator Gorton indicated would be of interest to the fishing and shipping industry, but not conventional data for the forecast models.

Senator Schmitt. To what degree does this decision on the part of—a one-satellite TIROS system, affect other Federal agencies?

Dr. Calio. Well, Dr. McElroy had indicated the effect on search and rescue and that we would be stretching that out. We would not have the number of satellites up simultaneously as was planned at one time, and there the response time or the time between detection—excuse me—the time between the event of a disaster, the time a disaster occurs, and when it is detected is inversely proportional to the number of satellites you have. So you could reduce the time from 12 hours to 6 hours if you had twice as many satellites. That is one impact.

The other is on the Earth radiation budget experiment [ERBE]. It will push that out further in time. Its contribution to the whole climate program would be delayed, because the spacecraft that that comes up on could be 56 months from now, that is over 4 years from now. We had planned to do that in the early part of 1985. So it would have an impact, a delay of about a year and a half on doing the Earth radiation experiment which NASA is conducting.

Senator Schmitt. Would the other agencies have any opportunities to discuss this decision with NOAA?

Dr. Calio. No, sir.

Senator Schmitt. Have they had any opportunity to discuss it since the decision? Have you had any comments from them?

Dr. Calio. Yes; they have. But I think all of us have been trying to figure out how we can produce more efficient operations in carrying out our responsibilities.

Senator Schmitt. It is a yes, but look what you did to us, kind of answer, right?

Dr. Calio. AGRISTARS will be impacted somewhat because of the agrimodels that were being developed. We will collect less data in support of that activity.

Senator Schmitt. Is there an AGRISTARS now?

Dr. Calio. I am advised it is——

Senator Schmitt. How is the patient doing?

Dr. Calio. I think the patient is sick. I am not sure. Let me get a direct answer from my budget people.

We do not have the detailed data, but there are activities still going on. I know I just received recently a request for a total program review and what the dollars are and what functions we will carry out in each agency over the next 6 months.

Senator Schmitt. Well, if you would want to revise and update or expand the data on the effect of this decision on other agencies, we would appreciate it for the record.

Dr. Calio. We can do that, Mr. Chairman.

Senator Schmitt. Are NOAA's geostationary satellites and/or polar orbiting satellites compatible with the Space Shuttle?

Dr. Calio. No; they are not directly today. We have to go through a modification program for the NOAA series, the TIROS-N series of satellites, with RCA and the GOES series. That is going to be not until the next buy, which is a block change.

So no, they are not. They are currently configured for an expendable launch vehicle. We are working out with NASA when we make that transition.

Senator SCHMITT. Have you analyzed the cost benefits of making those modifications?

Dr. CALIO. We sure have. I think that is ongoing right now. We have looked at it from both NASA's point of view and our point of view and the national point of view as to what is the best interest—what is the best thing to do. I do not have those numbers before me. I think we could probably provide those.

Senator SCHMITT. If you could provide those, some indication of that for the record, we would appreciate it.

[The following information was subsequently received for the record:]

Cost comparisons have been performed for both geostationary and polar-orbiting metsats. In the case of the geostationary satellites, which are launched from the Kennedy Space Center (KSC) in Florida, there is an official pricing policy, thus permitting accurate comparisons. For the GOES satellites, the comparison shows that because there are adequate opportunities for sharing shuttle launches, the cost of launching on shuttle is competitive with the cost of launching on Expendable Launch Vehicles (ELV's).

With respect to the polar-orbiting satellites, which must be launched from California, NASA has not announced an official pricing policy, giving the reason that so far there are no non-government satellites proposed for launch from this launch facility. Our cost comparisons were therefore based on NASA estimates prepared during the definition phase for the NOAA H, and I, and J satellite procurement. At that time, it was projected to launch these spacecraft in the 1985–1986 time frame. It should also be noted that sufficient spare Atlas launch vehicles exist to launch these satellites, but that it was assumed that NOAA would be the sole user of Atlas during this period. Thus, there was no cost for the vehicle itself, but there was a significant cost for maintaining an active launch facility at Vandenburg Air Force Base. After taking into account the above factors, including the capital cost for adapting the spacecraft for shuttle launch, it would cost NOAA an additional 75 million dollars to launch NOAA H, I and J on the shuttle instead of the Atlas expendable launch vehicles. Notice that this is cost to NOAA. This is important because the shuttle price assumes that NOAA complies with NASA requirements for a "Shared" launch in which NASA is responsible for finding a satellite to share the orbiter payload with the NOAA satellite on a 50/50 basis. At the present time, the prospects for such sharing are uncertain. If NASA should be unable to find sharing partners, it must pay the rest of the cost. Thus, the cost to the Government could exceed 100 million dollars. It is for this reason that NOAA plans to defer adaptation of polar-orbiting satellites to shuttle launch as long as possible and will therefore launch its next four satellites on ELV's even in the one-polar satellite system.

Senator SCHMITT. Do you know if the DMSP satellites are Shuttle-compatible?

Dr. CALIO. My answer to that has to be no, because we are using the same block spacecraft.

Senator SCHMITT. But it would be your intention, budgetary considerations permitting, to hold the line at the most cost effective point shuttle-compatible modifications, is that correct?

Dr. CALIO. That is correct.

Senator SCHMITT. What are they launched on now?

Dr. CALIO. Atlas F for the TIROS and the Delta for the GOES.

Senator SCHMITT. Has NOAA looked at the costs and benefits of repairable satellites versus the current expendable satellites?

Dr. CALIO. No, we have not.

Senator SCHMITT. Would you anticipate doing that in the near future?

Dr. CALIO. Well, that would be one of the things that we would look at with the block change, and I guess that is also something to be considered by our brother organization, NASA, on the ability to retrieve and repair satellites, because——

Senator SCHMITT. They are marketing the ability to retrieve and repair satellites. They are trying to get us to put out, what is it, $70 million, in order to allow them to demonstrate that they can do that, which they have done before. But nevertheless, they are asking us to let them do it.

Dr. CALIO. DMSP sort of depends on that, I think. That was designed to be——

Senator SCHMITT. That was designed a long time ago.

Dr. CALIO. Yes, sir. I have no comment on polar——

Senator SCHMITT. When will the RFP go out on the block, the new block?

Dr. CALIO. Let me ask Dr. McElroy the answer to that, because I think there are two different programs that are being handled two different ways.

Mr. MCELROY. I will tell you, I think we should probably provide that for the record, because we have to trace you through the expected lifetime under the one polar orbiter scenario and then go through the GOES series as well.

[The following information was subsequently received for the record:]

Contract award for the "GOES NEXT" satellites is planned for mid 1984. To meet this schedule it will be necessary to release the competitive Request for Proposal approximately one year earlier, or mid-1983.

The NOAA H, I and J satellite procurement will be sole source to RCA who provided previous satellites of this series. Contract award is planned for early fiscal year 1984. Final Request for Propsal release is required approximately nine months prior to this date. Instruments for these satellites are already on order.

Senator SCHMITT. Would you do that for us, please. And also indicate what you think, and for what reasons you think, you would have as part of that RFP repairability.

Mr. MCELROY. Yes, sir.

Senator SCHMITT. Shuttle compatible launch and shuttle compatible repairability.

Dr. CALIO. You are talking about polar?

Senator SCHMITT. I am talking about the ones you can get to in the current system, and I hope that we will have before the end of the decade a system you can get to the polar orbiter—I mean, to the geosynchronous orbiter. But we do not have that right now.

To what degree do developing nations, particularly equatorial nations, utilize our weather services, Tony?

Dr. CALIO. That is——

Senator SCHMITT. Do they generally subscribe to the World Meteorological Organization?

Dr. CALIO. Yes, and we transmit data directly to them through automatic picture transmissions. They are on—go ahead, Margaret. Why do you not go ahead and discuss this.

Ms. COURAIN. The climate impact assessments have been done on a number of developing nations of Africa and South America, and in some cases we have brought their people to the United States to work in our Columbia, Mo., modeling branch, to take very simple models of, say, a rice crop and learn how to use it with their own data.

So rather than making them dependent on us, we teach them to go back and use that, and in return we get the data that they have collected on their country. So this is one of the many pieces.

There are periodic reports put out on many of the developing countries that we do for AID, and that allows AID to assess whether the requests for drought assistance are correct.

Dr. CALIO. OK. Let me just give you the input here, and we can expand on this if you would like for the record. Data is distributed to 50 countries, 189 separate stations, via the Global Telecommunications System the World Meteorological Organization. Atmospheric temperature and humidity soundings are provided on a 500-kilometer grid.

GOES is provided to about 2,000 different points daily. Sea surface temperatures are also provided. We conduct experiments with the World Meteorological Organization, like the global atmospheric research program and the world climate program. And then we have special bilateral relationships with other countries.

We could expand the particular one about the equatorial countries if you have an interest in that.

Senator SCHMITT. Well, I just, again thinking in terms of what the potential impact would be of the one satellite system, since it affects equatorial conditions, and if there is any further expansion for that required for the record, we would appreciate it.

[The following information was subsequently received for the record:]

Many third world nations exist predominately in the equitorial and lower latitude portions of the Earth where weather changes are of an air mass variety. High and low pressure regions and storm fronts typify the weather of the mid-latitudes, but are largely absent in the third world. The low latitude weather changes little from day to day. The forecast problem usually is one of determining where and when the afternoon rains will occur. The four-times-a-day APT cloud cover pictures obtainable from a two-polar system provide excellent information on which to establish a weather forecast service in a third world country. However, in the absence of the regular coverage a geostationary satellite would provide, a one-polar system would provide data of cloud formations only twice per day. This simply is insufficient information to do a respectable forecasting job under third world conditions.

Conventional weather observation stations and communications between those stations and the central forecast office often are severely limited. A 1,700-mile wide swath of APT imagery four times a day allows a great leap forward toward a modern weather service. The World Meteorological Organization has assisted scores of third world nations in establishing APT reception capability over the past 18 years.

Dr. CALIO. All right, Mr. Chairman.

Senator SCHMITT. Since the cancellation of the national oceanic satellite system, has there been any further discussion regarding ocean remote sensing beyond what you currently have in place?

Dr. CALIO. Yes, there has been. I still believe strongly that we have the capability to be able to sense the ocean, the characteristics of the ocean surface, and we should do that. We have been discussing how we might be able to make these kinds of measurements in concert with the U.S. Navy and NASA.

[The following information was subsequently received for the record:]

At NOAA's request, NASA, using its own resources, has examined the technical feasibility of flying the Coastal Zone-Color Scanner (the CZCS of our existing design) or a scatterometer (new design) on the TIROS-N spacecraft. The conclusion is that either of these two sensors could be added without changing the basic complement of sensors on the spacecraft. Both ocean sensors could not be accommodated without eliminating the basic weather sensors. NOAA, DOD, and NASA are now exploring further ocean remote sensing alternatives.

Senator SCHMITT. Does the one satellite system decision affect this, these considerations, one way or the other?

Dr. CALIO. No, not at all, no. I guess you are thinking, can we make the change to the existing polar orbiting weather satellite. We are looking at that. But the one satellite configuration does not affect it.

[The following information was subsequently received for the record:]

Reduction of the polar-orbiter program from a two-satellite system to a one-satellite system reduces the opportunities to fly new, special purpose sensors such as the CZCS, scatterometer, Earth Radiation Budget Experiment, and the Search and Rescue package. New trade-off studies will have to be made to select among this candidate list. Previous decisions may have to be reversed or at least the schedules changed. It does not necessarily follow that the conversion to a one-satellite system would preclude the addition of ocean remote sensing capabilities until the end of the decade. Such a capability might be considered a higher priority than other possible uses of the satellite's capacity. It would, however, require about six years to obtain the funding and contract for modifications to the spacecraft bus to carry an "off-the-shelf" instrument such as the CZCS. Development of a new scatterometer would take longer. Thus, even limited ocean remote sensing capabilities on a NOAA polar-orbiter would not be possible before about 1988, even under a two-satellite system.

Senator SCHMITT. It just further reduces the total amount of data available?

Dr. CALIO. That is right, that is right.

Senator SCHMITT. What will the $14.955 million requested for LANDSAT be used for?

Dr. CALIO. The $14.955 million fiscal year 1983 budget request is primarily for maintenance and operation costs associated with collecting, processing, and distributing the data from LANDSAT, none of the capital acquisition costs.

Senator SCHMITT. How is the processing time now in that system? Has that improved since a few years ago when we were discussing it?

Mr. MCELROY. We have taken two steps, Senator. One was to upgrade the capability in the existing LANDSAT II and III system. In recent months we have even had turnarounds as short as 36 hours for critical data in that system, so that the backlog——

Senator SCHMITT. Is that computer compatible tape?

Mr. MCELROY. Yes, sir. Some other agencies have approached us in the past and needed very special products. The system has shown its capability after repairs that were done in the last 2 years. And the backlog that I know you are familiar with does not exist any more. There is less than a 2-week normal backlog, and as I say in special cases we have done even 36 hours. So that was a problem which was very thorny, but which was solved. With the LANDSAT D we are shooting for a 48-hour turnaround.

Senator SCHMITT. That is through Sioux Falls?

Mr. MCELROY. That is through Goddard.

Senator SCHMITT. Goddard.

Mr. MCELROY. Yes, sir.

Dr. CALIO. We have taken many slings and arrows on that. I must commend my colleagues in NASA and especially the Goddard Space Flight Center for really fixing that.

Senator SCHMITT. It sounds super, you are right, if they change 6 months to 48 hours practically.

Dr. CALIO. The backlog, I remember that was on my watch, was a difficult problem to resolve. And Goddard really, you know, responded to correction of that problem.

Senator SCHMITT. You are not suggesting, having transferred you to NOAA, we solved that problem?

Dr. CALIO. Possibly, sir.

Senator SCHMITT. Do you plan user fees for LANDSAT data services?

Dr. CALIO. Yes, sir. I guess we have not in my statement provided the user fee charges, but they have been promulgated, published to the community. They are about a 2½-times increase over what they have been in the past, and comparable budgets have been established with the Department of Agriculture and with the Interior to pay those costs in their current budget.

Senator SCHMITT. It will include those—we will include that schedule in the record at this point.

Dr. CALIO. Yes, sir.

[The material referred to follows:]

MSS products and prices

	Price
Film products:	
70mm film positive (B&W)	$26
70mm film negative (B&W)	32
10 in. film positive (B&W)	30
10 in. film negative (B&W)	35
10 in. paper (B&W)	30
20 in. paper (B&W)	58
40 in. paper (B&W)	95
10 in. film positive (color)	74
10 in. paper (color)	45
20 in. paper (color)	90
40 in. paper (color)	175
16mm microfilm (B&W)	60
35mm slide (color)	4
16mm microfilm (color, 100′ roll)	150
Digital:	
9 Track, 800 BPI CCT MSS Scene—all available bands	650
9 Track, 1600 BPI CCT MSS Scene—all available bands	650
9 Track, 800 BPI CCT RBV single—subscene	650
9 Track, 1600 BPI CCT RBV single—subscene	650
9 Track, 800 BPI CCT RBV—set of 4 subscenes	1,300
9 Track, 1600 BPI CCT RBV—set of 4 subscenes	1,300
14 Track, High Density Tape—variable content	(1)
Color Composite (false color IR), add to product price	195
Special Acquisitions: Scenes not scheduled for routine data collection, but provided on user request:	
Delivery of HDT via communications satellite—per scene	790
Delivery of standard MSS imagery (not color composite)—per scene	880
Delivery of CCT or HDT—per scene	1,000
Surcharge for color composite—per scene	150
Surcharge for specified cloud cover allowances—per scene	250

[1] Variable.

Senator SCHMITT. And how much of the cost of operations of the system do you anticipate recovering when these fees are fully in place?

Dr. CALIO. If there is no degradation or no elasticity in the market?

Senator Schmitt. Assuming you have the same level of demand.

Dr. Calio. About $24 million.

Senator Schmitt. Those are cost-based user fees?

Dr. Calio. Yes.

Senator Schmitt. Have you seen any——

Dr. Calio. Excuse me. I had better make that point clear.

Mr. Smith. We expect to recover approximately $14,955,000 from the public and $9,785,000 from other federal agencies.

Senator Schmitt. Other agencies besides NOAA. You do not consider the public a Federal agency.

Mr. Smith. That is correct.

Senator Schmitt. And that pretty well makes the costs then, is that what you are saying?

Dr. Calio. The $24 million, that is the estimate we have today for the operating costs for LANDSAT D in fiscal year 1983.

Senator Schmitt. Have you seen any indication of a dropoff in demand as a result of the new schedule?

Dr. Calio. No. They are not in place yet, but I do not see that as a potential problem. Let me just stop it right there. Dr. McElroy has indicated we have had complaints, but——

Senator Schmitt. I am sure you have.

Do you have some general breakdown of—over the last 3 or 4 years of the portion of the national and international community demand for various industries or various sectors of the——

Dr. Calio. I do not think we have it by sector. We can tell you—I am trying to remember off the top of my head. Let me see, half of the products came from the U.S. Government, half was—is that right? Half of it from the nongovernment, and of the half that was nongovernment about half again was foreign—were foreign. So about a quarter of the products that are produced from the data base at Sioux Falls I think were foreign. That was split by industry——

Senator Schmitt. If you have some further breakout of that information——

Dr. Calio. I believe we can get that from our colleagues.

Senator Schmitt. We would appreciate that for the record.

[The following information was subsequently received for the record:]

Over the past four years, foreign purchases have accounted for more than a third of all sales of Landsat data products from the EROS Data Center (EDC) in Sioux Falls, South Dakota. U.S. industry has comprised on the average 25 percent of total EDC sales; state and local governments, 5 percent; academic institutions, 10 percent and the Federal Government, 20 percent. These figures do not take into account the Landsat data that have been distributed directly from NASA's Goddard Space Flight Center in Greenbelt, Marryland to Federal Government user agencies. These latter Federal users will begin to pay for data received as of October 1, 1982, and are expected to bring the Federal share of data distribution by U.S. facilities to around 50 percent.

Recent trends in all sales at the EROS Data Center show that users are reacting to EDC's higher prices that were instituted October 1, 1981, by buying fewer Landsat products, although the total revenues are remaining about the same as last year, as is the relative breakdown of purchasers by sector.

Senator Schmitt. Is the Soviet Union still buying everything that comes out?

Dr. Calio. As far as we can tell.

Senator Schmitt. Can we ask them to pay in gold?

What is the status of the COMSAT proposal to operate the meteorological satellites? Is that wrapped up in this Cabinet council decision process?

Dr. CALIO. I do not think so, because I have not seen a COMSAT proposal. I have seen COMSAT concept papers I have not seen a formal proposal.

Senator SCHMITT. You say as far as you know there is not a formal proposal.

Dr. CALIO. As far as I know of.

Mr. MCELROY. That is right.

Dr. CALIO. There are a lot of concepts that have been presented to different elements of the Executive branch.

Senator SCHMITT. During joint hearings last July before this committee and the House Committee on Science and Technology, it was suggested that COMSAT operation of MARISAT was analogous to their possible operation of the METSAT and the LANDSAT's. Do you agree, and if not would you comment? Or would you rather not discuss it until after the council has met?

Dr. CALIO. I would prefer not to discuss it until after the council meets.

Senator SCHMITT. We will have a chance to discuss it with Mr. Byrne.

You have indicated, and I will repeat it, but you have indicated there is a strong working relationship and a good working relationship between the civilian and the military weather satellite systems. Am I correct in that assumption?

Dr. CALIO. Yes, sir. Yes, sir, absolutely.

Senator SCHMITT. You have no difficulties, other than the normal business?

Dr. CALIO. I think it works extremely well. I would hope my colleagues in the Defense Department would feel the same way.

Senator SCHMITT. Relative to our previous discussion of research and development activities within the agency, could you give us some indication of the 10-year history of research and development funding within the agency, and broken out to the level that you think you can handle in a general way?

Dr. CALIO. Yes, I will. Now you are talking about satellites, Mr. Chairman, or what?

Senator SCHMITT. No. General research and development in the agency, and then break out the satellites, the major categories of research and development.

Dr. CALIO. OK. But this is total agency, all research and development, and then by appropriate components?

Senator SCHMITT. Yes.

Dr. CALIO. OK.

Senator SCHMITT. Now, NOAA, because of the budgetary circumstances—and there may be other reasons—is going to cut back in various research programs. EDIS uses much of that data generated by other NOAA projects. What effects will those aggregated cutbacks in research have on the services provided by EDIS, and what effect will it have on services provided by other federal agencies?

Ms. COURAIN. We have not really looked at the cuts from the idea of how much data would be coming from them, but it is a fairly small portion of the total data coming in to EDIS. Very important data, but in terms of volume it is not on the same scale as, for example, the data we get from the National Weather Service or from NESS.

Dr. CALIO. We can provide that.

Ms. COURAIN. We will certainly provide that.

[The following information was subsequently received for the record:]

Only two of the proposed research reductions would have significant impacts on EDIS services. These are (1) the Space Environment Laboratory (SEL) and (2) the Marine Ecosystem Analysis (MESA) regional programs.

(1) Space Environment Laboratory:

(a) *Input:* EDIS' National Geophysical and Solar-Terrestrial Data Center (NGSDC) currently receives some 7,000 megabytes of digital solar-terrestrial physics (STP) data from SEL each year, about half of NGSDC's annual inflow of digital STP data. The following data are provided:

1. SMS/GOES/magnetometer data (digital and analog)
2. SMS/GOES solar X-ray data (digital and analog)
3. SMS/GOES particle data (digital and analog)
4. TIROS and NOAA satellite measurements of energetic particles and integrated total energy (digital)
5. Ground-based magnetometer data relayed via GOES
6. Summary data on Solar flares and activity for publication in Solar Geophysical Data.

NGSDC receives processed, checked data for archiving, distribution to secondary users and sometimes reuse by SEL. The data are published and reach between 800 and 900 direct subscribers monthly. NGSDC also supplies copies of other SEL data on request about 150 times a year.

(b) *Users:* Of the 2,000+ STP data requests received by NGSDC annually, about 25 percent (500) come from government agencies and 30 percent from academia (presumably sponsored by the government). About one-fourth (100+) of the government requests come from SEL itself. Other government users include the Department of Commerce's Office of Telecommunications, the Air Force Geophysical Research Laboratories, the U.S. Geological Survey, and NASA.

(c) *Impact:* If SEL space environment activities are eliminated or significantly reduced, NGSDC would receive only raw data tapes, rather than processed, quality controlled, and cataloged data. We could provide only these raw data, which would have to be processed, quality controlled, and formatted by the user.

(2) Marine Ecosystem Analysis Regional Programs:

(a) *Input:* The EDIS National Oceanographic Data Center (NODC) receives significant amounts of data from the Marine Ecosystems Analysis (MESA) regional programs. Over one-third of the approximately 12 million records in one of NODC's major data files resulted from MESA studies.

(b) *Users:* Users of MESA data include industry (one-third), NOAA (one-third), and foreign, research, academic and other government individuals and organizations. The data are used primarily in environmental analysis and impact studies.

(c) *Impact:* If these programs are cut, no new data will be produced add to the archives for previous collection programs, and no collection programs will be undertaken in new areas, so that U.S. geographical coverage of the data base will be limited.

Senator SCHMITT. OK. And also, whatever impact on your sister agencies, research that may be done in those other agencies.

Dr. CALIO. Yes.

Senator SCHMITT. And on the other hand, EDIS I guess proposes to cut back information services for other NOAA divisions and presumably other agencies. So if you could provide a comparable analysis on that backflow.

Dr. CALIO. Yes, sir.

[The following information was subsequently received for the record:]

EDIS proposes to cut back some of its library and publications services to other NOAA components, not services to other agencies. A transition plan has been prepared, and representatives of the NOAA components involved met on May 7, 1982, to discuss ways for the individual NOAA components to manage the lost EDIS publications support services.

Senator SCHMITT. Now finally, Tony, there is proposed legislation to deal with the management and operation of a civil land remote sensing space satellite system. Could you just generally summarize the concepts that you feel should be embodied in that legislation?

Dr. CALIO. We have that piece of legislation before the Congress right now. A letter was sent forward by Secretary Baldrige on March 1 updating the bill submitted on May 5, 1981 to reflect the fiscal year 1983 budget request of $14,955 million. That legislation is needed to authorize NOAA to operate civil operational land remote sensing from space. It includes provision of authority to collect user fees to recoup the Governments investment of $14,955 million.

The legislation is a straightforward request from us to allow us to operate and collect user fees. It is an interim request for authorization pending further guidance from the C.C.C. & T. Subsequent to any action that takes place by the council tomorrow or in the near future, then we would have to come up with additional legislation as to how we would handle the commercialization, if I can use that term, of LANDSAT, and we have to bring that forward to you in the near future. But that is not tied up with giving us the capability to operate LANDSAT D come January 1983.

The Bill would cover system planning, operation and management of the LANDSAT D activities and give NOAA authority to charge user fees for the standard data products that we plan to produce.

Senator SCHMITT. OK. Well, we did not do too badly. We will get back with you in the next hearing with the Administrator and get maybe more deeply into some of these, as well as other issues involving other programs in NOAA.

Thank you very much, Tony. You and your colleagues are to be commended for working in a very difficult environment, but trying to do the best you can. And we will certainly try to help you.

Dr. CALIO. Thank you very much, Mr. Chairman, especially for your support.

Senator SCHMITT. Thank you.

The hearing is adjourned.

[The statements follows:]

STATEMENT OF DR. ANTHONY J. CALIO, DEPUTY ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE

Mr. Chairman and Members of the Committee, I am pleased to appear before you to discuss NOAA's satellite program and Environmental Data and Information Service (EDIS).

Our environmental satellites service America's need for data about the earth atmosphere and ocean systems, by collecting global information applied to meteorology, hydrology, and oceanography. Our information service assists in distributing satellite data as well as other environmental data collected by other names to various commercial, governmental, and international clienteles.

Prior to the use of satellites, meteorologists depended on observations from land stations, ships, and radiosonde balloons. Forecasting downwind of heavily-populated areas was based on fairly good data-bases, but data from the oceans, especially off the west coast of the United States, were highly inadequate. Ship-borne observations of winds and pressures were discontinuous, not available routinely and limited to the major sea-lanes. Even on land, large sparsely-populated regions produced few data. There certainly was no global picture of the weather. Twenty years ago, the first crude satellite pictures of the clouds were just emerging mathematical models of the atmosphere were barely out of the console there were no colorized radar displays and the data communications network was primitive. There have been vast improvements in each of these areas over the past decade or two and many of the gaps in the forecasting data-base have been closed.

When the polar-orbiting TIROS-1 satellite was launched in 1960, the first "products" of interest to meteorologists were the basic cloud pictures. But it wasn't long before global observations of circulation patterns established guidance for regional weather forecasting with the launch of the TIROS Operational Satellite series and, with growing assistance from computers, the products began to diversify. The satellites verified cloud locations and movements but could not measure temperatures to verify radiosonde information. Soon, the Improved TIROS Operational Satellite (ITOS) System provided sensors for indirect soundings as well as infrared scanners for thermal target sensing and nighttime imaging. Eventually, verification or radiosonde temperature data was achieved, but moisture profiles were still unavailable.

The early 1970's brought with it the Synchronous Meteorological Satellite (SMS) and the Geostationary Operational Environmental Satellite (GOES) series, which continuously viewed the Western Hemisphere from a height of 35,000 km above the earth's equator. The products received improved steadily. In the late 1970's the third generation polar-orbiting system, TIROS-N, was launched into a sun-synchronous orbit. It contained a refined set of instruments with visible and infrared channel selection, an advanced atmospheric sounder, and a data collection and platform locator. Currently, two polar-orbiting satellites of the TIROS-N series view the earth at the rate of 14 orbits each day.

Rapid development in environmental sensing resulted in continued growth of the products offered. These range from photographic displays, charts, and teletype messages to the raw-data available on computer disk and tape. I will describe these products in more detail later in my statement.

Today, the routine weather forecasts and the severe-weather warnings that are issued by the National Weather Service would be seriously degraded without satellite data. And, when you consider that severe weather takes about one hundred lives every year and costs tens of billions of dollars, the value of recent forecast improvements cannot be underestimated. For example, when hurricane Frederick slammed into the Mississippi coast in September, 1979 with one hundred and twenty mile-per-hour winds, it was one of the most powerful storms ever to strike the Gulf area. Frederick was tracked by satellite for days; warnings were issued well in advance and hundreds of thousands were evacuated. We were ready—and fewer than ten lives were lost. Who knows what the toll would have been in 1959?

Weather forecasting, however, is only one part of the picture. We live in a world of rapid population growth, urbanization and industrialization. Together, they place a heavy burden upon diminishing resources of topsoil, forests, clean air, fresh water and terrestrial minerials. The efficient mining, production, transport, use and disposal of these resources cannot be left to chance, and satellites help us monitor all of them and their interactions with the environment.

Satellite data may also assist us in working with these resources and providing advanced warning of long-range, man-induced physical, chemical and biological changes in the ocean/atmosphere complex, such as those induced by the ozone fluctuations and CO^2 build-up, which may radically shift rainfall and temperature patterns. The Global Atmosphere Research Program (GARP) has helped us understand both of these phenomena better by providing details on ocean/atmosphere interactions that were heretofore obscure.

NOAA'S SATELLITE PROGRAMS

The objective of NOAA's meteorological satellite program is to provide continuous observations of environmental conditions of the earth's surface, oceans, atmosphere, and near space. Since 1960, data from the experimental and operational environmental satellites have contributed significantly to the nation's environmental monitoring, prediction, and warning services. Similarly, the objective of the Landsat program is to monitor the earth's surface through remote-sensing in order to obtain data for locating, developing, and managing natural resources, both renewable and non-renewable. Landsat soon will be moving from an experimental to an operational phase and will be a valuable source of information for both the private and the public sector and governmental communities.

METSATS

The effect of weather satellites on meteorological science has been profound. They have opened up new possibilities for improving the accuracy and time-range of weather forecasts. At the beginning of the space age, meteorological theory had outrun our ability to collect the necessary observations. Theoretical breakthroughs in numerical weather prediction and the availability of digital computers simply demand continuous global observations. The balance is now redressed.

NOAA's polar-orbiting satellites are sun-synchronous and observe the same region of the earth twice every 24 hours. Geostationary satellites focus on the same areas and can also provide pictures of the entire globe once every 30 minutes. The combination of polar-orbiting and geostationary satellites provides data on phenopmena as small as tornadoes and thunderstorms, and as large as planetary wind circulation. They operate both day and night, observing both visible and infrared spectra.

The Polar and GOES NOAA satellite sensors provide two types of products: image and quantitative or digital. The satellites also serve as communication links for the efficient and timely delivery of those products.

Satellite images are analyzed to provide storm warnings, vegetation measurements, ocean current information and the location of sea ice. The quantitative measurements provide data about atmospheric temperature and humidity profiles. They also yield information on sea-surface temperatures, cloud albedo, and ice conditions. From the motions of cloud elements observed by GOES satellites it is possible to ascertain the direction and velocity of upper level winds as a function of cloud altitudes. These wind observations become part of the National Weather Service (NWS) numerical calculations which form the basis of computer predictions of the weather. NWS also employs polar sea-surface wind data to determine the heights of surface waves, which in turn affect oxygenation, evaporation, and other conditions on or near the surface. Evaporation, of course, is the main medium for the transfer of heat energy from ocean to atmosphere and thus a key element in the formation of hurricanes. NWS computer models incorporate all such variables in creating an integrated picture of the earth/atmosphere complex at a given time and place, so that weather offices get the documentation they need to determine their regional and local forecasts.

The National Ocean Survey (NOS) uses satellites in geodesy and tidal analysis programs. These programs include the application of radar altimetry from the GEOS-3 satellite. The use of Seasat altimeter data, Doppler positioning data from Navy Transit satellites, determination of precise locations in the North American Satellite densification network, improvement of knowledge of the earth's gravitational field from analysis of satellite orbits, and liaison with NASA to ensure NOAA requirements are included in future NASA satellite programs.

The National Marine Fisheries Service (NMFS) cooperates with industry, NASA and NESS to demonstrate the applicability of satellite remote-sensing for improving fisheries management, research and utilization.

Under Public Law 95-95, NOAA is responsible for conducting a program of monitoring and research related to stratospheric ozone. This program includes a ground-based network of Dopson ozone measurement instruments which forms the operational NOAA monitoring system and provides verification data for the satellite ozone-monitoring instruments on NOAA's polar-orbiting satellites and the NASA Nimbus and Explorer research satellites.

NASA and NOAA jointly are engaged in a program to design, fabricate, and operate a satellite ozone measurement system, the Solar Backscatter Ultraviolet (SBUV/2) system, on operational environmental satellites. The present schedule calls for inclusion of the first SBUV/2 on the NOAA-F satellite around mid-1985.

FISCAL YEAR 1983 METSAT BUDGET—136.543M

The budget for NOAA's satellite services is sufficient to permit us to accomplish the basic program objective, i.e. the regular and reliable collection of quantitative environmental data on a global scale. The only increases are for system improvements to ensure compatibility with the NASA communications network and for procurement and launch services vis-a-vis the ongoing satellite program. This budget permits a continuation of projected funding levels for the geostationary satellite program, a decrease of one satellite in the polar-orbiting satellite program, and a request for Landsat funding that will be offset by user fees. The NESS budget includes:

Spacecraft procurement	$40,383,000
Launching costs	34,929,000
Total	75,312,000
Ground system procurement	13,188,000
Spacecraft control and data acquisition	16,708,000
Data processing and dissemination	24,813,000
Supporting R. & D	6,522,000
Total	136,543,000

GEOSTATIONARY (GOES) SATELLITES $62.859M

The GOES satellite mission is to continuously and reliably collect real-time environmental data including the use of visible and infrared imagery, the collection of solar and near-space environmental and other data, the use of WEFAX (Weather Facsimile) and the experimental atmostpheric soundings experiment.

DATA SOURCES

The geostationary satellites of the SMS/GOES series are equipped with a Visible and Infrared Spin Scan Radiometer (VISSR) Visible Atmospheric Sounder (VAS), Space Environmental Monitor (SEM), and data-relaying capabilities. the satellites maintain a geosynchronous orbit viewing the Western Hemisphere at an approximate altitude of 35,800 Km over the Equator. The satellite pictures you see on TV weather programs come for GOES satellites.

VISA

VAS provides the first measurements of atmospheric temperature and moisture from a geostationary satellite. It can be commanded to scan parts of the Earth at three to fifteen minute intervals in order to monitor the development of tornadoes or other severe storms. Sufficient VAS data have been obtained to demonstrate their potential for improving North American weather forecasting models over the eastern Pacific, diagnosing moisture patterns and circulation not otherwise evident in upper-air data, enhancing diagnosis of frontal and squall-line structure, and improving height assignments to cloud-motion winds.

SEM

GOES satellites carry a Data Collection System for the acquisition of environmental data from remote observing platforms, and a special monitor (SEM) which provides solar radiation data to NOAA's Space Environment Laboratory. SEM sensors continuously monitor the flux of energetic particles, solar x-rays and magnetic fields. These data are fundamental in geophysical research and alert ground communication systems to imminent solar storms.

DCS

GOES-DCS enables us to collect and relay data from remotely located environmental monitoring platforms such as buoys, river gauges, automatic weather stations, seismic and tsunami stations and manned ships. The satellite communication system transmits VISSR, SEM and local-environment monitor data to primary receiving sites and transmits Weather Facsimile (WEFAX) data to local users.

DATA SERVICES

GOES sensors provide many services, including: severe-storm detection and tracking; cloud-motion (wind) measurements; sea-surface thermal features; precipitation estimates; frost monitoring; data collection from remote surface platforms and development of new products.

DATA APPLICATIONS

These services support many programs, the most important being meteorology, through detection and monitoring of the growth and decay of severe-weather events, including hurricanes and severe thunderstorms.

The NWS uses information from the environmental satellites for weather forecasts and warnings and for ocean and hydrological services. Pictures from the satellites, showing weather systems of all sizes and intensities, are sent to forecast offices and warning centers, where they are used to follow weather over data-sparse areas and for detecting rapid developments and movements of small, severe-weather systems and flood-producing rainfall.

The data used to make these displays are obtained from the Visible Infrared Spin Scan Radiometer (VISSR) sensor on board the Synchronous Meteorological Satellite (SMS)/Geostationary Operational Environmental Satellite (GOES) series. Full-disk and sector displays are useful as a real-time source for the location of actual or potential severe weather and for issuing advisories to data-sparse areas, for following cloud motion and for deducing wind speed and direction from successive pictures. As a research tool or in alerting forecasters to potential areas of concern, the photographic images may be altered by enhancing the data displayed. Color enhancement can emphasize areas of interest such as cloud tops, stratus decks, fog areas, etc., by alteration in the "gray scale" used.

NWS forecasters have learned to identify the areas of most intense thunderstorm activity and are continuing to learn to estimate rainfall from intense thunderstorms. Satellite-derived temperature and moisture soundings are useful in computer modeling of the global atmosphere. Pictures and derived information also are used for mapping snowfield extent, for ice surveillance, and for locating surface positions of major ocean currents and areas of cold-water upwelling of interest to shipping and fishing operations. NWS continues to provide reimbursable meteorological support to NASA; support is also provided for the Space Shuttle and Stratospheric Ozone Monitoring.

NWS also uses meteorological satellites to communicate information from remote sensors to meteorologists, oceanographers and hydrologists. These ground stations include remote sites in the NWS hydrologic network, remote automatic weather observing stations and remote sensors in the tsunami warning network. The weather picture and weather chart communications (WEFAX) capabilities of the GOES satellites provide forecasters with a means of rapid, relatively inexpensive, international distribution of weather information.

The National Earth Satellite Service is a critical component of NWS forecast and warning services. The near-continuous, high-resolution infrared (IR) soundings and multispectral imaging from GOES VAS have improved NWS forecasts and warnings. Stereo imaging with GOES for storm intensity, growth monitoring and multilevel winds is a technological opportunity NESS and NWS are developing.

GOES satellite services also support hydrology (by flood forecasting and water-resource management), oceanography, agriculture and other programs which benefit from GOES imagery and data.

GOES Budget

The fiscal year 1983 budget request maintains the two-satellite configuration for GOES, critical to obtaining images of the movement of destructive weather systems over much of the Western Hemisphere. Although the budget reflects an increase of $35.464 million over the fiscal year 1982 figures, this amount actually represents a continuation of procurement already underway, not an increase over the previous rate of expenditure. In summary, the GOES budget request includes:

An increase from fiscal year 1982 to fiscal year 1983 due to the normal expenditure rate for GOES G, H and I spacecraft which will be purchased starting in fiscal year 1982. (The planned launch date for GOES G is fiscal year 1985.)

A $7 million ground-systems request for compatibility with changes in the NASA communications network.

GOES 4 and 5 were launched on September 9, 1980 and May 22, 1981, respectively, and are located at 74° and 135° west longitude (Chart 1). They comprise part of a global network of geostationary meteorological satellites (Chart 2). Geostationary installations are also maintained by the European Space Agency, Japan and India. Sensor procurement and construction of GOES F and G will continue under the fiscal year 1983 budget. Launch of GOES-F can take place in early 1983 in the event of a failure of GOES-E.

Polar-Budget Satellites $25.641M

NOAA's polar-orbiting satellite system, also called the NOAA or TIROS-N series, collects global observations in support of numerical weather analysis and prediction, flood forecasting, water-resource management, fishing, shipping and ocean monitoring services, crop-production forecasting and solar monitoring. These observations are obtained from: atmospheric soundings; sea-surface temperatures; snow and ice mapping; near-space and solar particle data; day and night imagery; data-collection platforms; ozone monitoring; search and rescue experiment; and earth radiation-budget experiment.

Polar-orbiting satellites of the TIROS-N/NOAA series are launched into sun-synchronous orbits 870 km above the earth with Equator crossings near 3:00 and 7:30 A.M. and 3:00 and 7:30 P.M. local sun-time for spacecraft one and two respectively.

DATA SOURCES

The polar satellite sensors include the Advanced Very High Resolution Radiometer (AVHRR), High Resolution Infrared Sounder (HIRS/2), Stratospheric Sounder Unit (SSU), Microwave Sounder Unit (MS), Data Collection System (DCS) and the Space Environment Monitor (SEM).

AVHRR

The AVHRR is a five-channel imaging device that continuously scans in a horizon-to-horizon cross-track mode with scan steps provided by the forward motion of the spacecraft. Visible and infrared data resolution are approximately 1 km.

TOVS

The HIRS/2, SSU and MSU instruments are functionally separate units of the TIROS Operational Vertical Sounder (TOVS), combining retrivevals from 27 spectral channels to produce atmospheric temperature profiles from the surface to 10 mb, water-vapor content of the atmosphere at three levels and total ozone content.

DCS

The DCS is designed to obtain environmental data from fixed or moving platforms (buoys, ships, balloons, etc.) while allowing for earth location of up to 4,000 platforms in a 24-hour period. Information is received by a non-interrogating random-access system which stores the data, signal frequency and time of each transmission for up to 459 platforms in view. All data stored are retansmitted to Command and Data Acquisition (CDA) stations or echoed back to ground stations in view of the satellite at receiving time; the latter transmission does not contain earth-location data. Earth-location is performed by ground systems using the Doppler shift in frequency of successive platform transmissions.

SEM

The SEM is the same unit described under the SMS/GOES satellite series.

DATA SERVICES

The most important data element is temperature soundings, a measure of temperature at different altitudes in the atmosphere. Temperature is in part a function of air density, and density differences generate winds, so NWS uses these data to predict both temperatures and winds. NOAA developed a GOES Sounder System (VAS) so NWS could obtain this information at any given time for any area rather than just during transits of the polar satellites. As previously mentioned, the VAS system also provides invaluable humidity information.

Polar and Great Lakes Ice Monitoring

In past years shipping operations in the Arctic and Antarctic regions, the Great Lakes and the St. Lawrence Seaway have been greatly obstructed by sea, lake and river ice. Now, however, polar satellite observations of ice conditions enable the NOAA-Navy Joint Ice Center to provide accurate analyses and forecasts to civil and naval shipping. For example, polar satellite observations of ice patterns in Cook Inlet are used to plan construction of dock facilities for the transportation of coal from Alaska.

Sea Surface Temperatures

As of November 1981, NOAA/NESS initiated a new system for producing more accurate and detailed global and regional daily sea-surface temperatures from polar-orbiting statellite data. From ocean temperatures one can identify, for instance, the presence or absence of currents such as the Gulf Stream. This information is of great interest to the shipping industry which reports savings of up to $8,000 per vessel per trip. In addition, thermal patterns associated with ocean nutrient upwell are used by the west coast fishing industry in locating target species. Finally, monthly mean sea-surface temperature charts for the earth as a whole provide valuable imput to numerical models of weather and climate.

Crop Forecasts

NOAA's National Earth Satellite Service has begun the development of five products from polar satellite data that the Department of Agriculture will use as part of the so-called Project on Agriculture and Resources Inventory Surveys Through Aerospace Remote Sensing (AGRISTARS), designed to improve our knowledge of the earth's food crops. These five products—precipitation estimates, maximum and minimum temperature patterns, amount and duration of insolation, snow-cover estimates and coarse-vegetation indices of crop condition—will alert the agricultural community to droughts and untimely freezes, and help forecast key commodity production around the world. Information on global crop production is required for effective response to fluctuations in the world food supply. This information is useful to all sectors of the agricultural community including individual farmers and ranchers, commodity analysts, agribusiness and agricultural policy makers.

Polar Budget

The 1983 budget request of $25.641 million for polar spacecraft, launching and ground systems represents a reduction of $24.665 from the fiscal year 1982 base. Polar coverage will be cut from two to one-spacecraft system, with replacement launches planned for 18-month intervals. The request allows for the delay of NOAA H through J spacecraft procurement to fiscal year 1984. We expect to save approximately $271 million in Federal expenditures over the life of the revised polar-orbiter spacecraft launch planned by 1992, while still providing meteorological information essential to the United States.

The requested budget will permit: environmental testing and launch of NOAA E; fabrication, integration and testing of NOAA D through G; sensor procurement for NOAA H through J; detailed design-studies to modify NOAA H through J for launch on the shuttle; continued refurbishment of Atlas F launch vehicles and processing system.

SATELLITE INFORMATION DELIVERY

Ground Systems

Geostationary satellite ground systems are dedicated to rapid production and dissemination of images from the GOES satellites via direct rebroadcast to a small number of users of raw data. The GOES images are also broken down into small portions, enlarged and distributed over commercial telephone lines to more than 400 individual users via the automatic GOES TAP system.

The polar satellite ground system is designed for the rapid production of numerical data products (e.g. sounding data and sea-surface temperatures) and images.

The communication systems of the polar-orbiting satellites provide raw-data readout of AVHRR, TOVS, DCS and SEM data to ground receiving-stations around the world having Automatic Picture Transmission (APT) and modified S-Band High Resolution Picture Transmission (HRPT) receiving equipment.

All sensor data for central processing are acquired by the NESS Command and Data Acquisition Stations at Gilmore Creek, Alaska, and Wallops Island, Virginia. Raw-data signals are retransmitted via microwave and commercial communication satellites to Suitland, Maryland, where they enter a specialized Digital Data Handling Facility (DDHF). Dedicated medium-scale computers within the facility are used to perform certain preprocessing tasks and to arrange the data for further treatment by means of either manual analysis or largescale machine computation.

The data stream arriving at Suitland, Maryland is recorded on a photofacsimile recorder or on digital magnetic tape or both. Again, data are available for further manual treatment or as input for large-scale computer processing. Photographic imagery products are not available until at least 1½ hours after receipt of signal at NESS. Photofacsimile recording time and phota lab processing time of about 45 minutes each account for this delay. In addition, certain photo products by their nature (e.g., end-of-day mosaics, multiday composites) contribute to the delay. Data flow of the geostationary and polar-orbiter systems are displayed in figures 2 and 3.

Satellite Communications Systems—WEFAX, ARGOS, DSC, the GOES Data Collection, GOES-TAP and APT and HRPT systems—assure efficient and economical delivery of data.

The Weather Facsimile (WEFAX) System transmits both conventional weather charts and polar and GOES satellite pictures. There are 150 national and international WEFAX users receiving satellite images and weather charts every day. This information is often the only source of weather forecast data available.

The French ARGOS Data Collection and Platform Location System, carried on NOAA polar-orbiting satellites, transcribes ocean current and ice data from remote-measuring platforms, thus providing input for climate research programs.

The GOES Data Collection System (DCS) is used to relay data from more than 2,500 earth sites (a 100 percent increase in the past year). There are 13 direct-readout stations for DCS and two more will become operational this year. The most recently installed terminal, in Honolulu, will allow instant delivery of hydrologic, oceanic, atmospheric and terrestrial observations made by sensor-buoys, river and tidal gages, seismometers, ships, aircraft and other reporting platforms. This will allow Hawaii to receive crucial weather information without having to communicate through a GOES-TAP (telephone link) to Wallops Island, Virginia. The GOES-TAP system disseminates geographic images over standard telephone circuits. The original 50 NWS forecast office TAPS, started in 1975, have increased to 200 and now attract a variety of users including NWS, the military, private meteorological firms, TV stations and various academics. To accommodate the rising demand, NOAA has initiated hardware modifications that will permit more than 400 connections.

One of the attractive features of NOAA satellites is the Automatic Picture Transmission (APT) System. For a very small expenditure, receiving equipment can be built to display AVHRR, TOVS and SEM data observed by the polar satellite as it passes overhead. This real-time local readout of weather information is vital for nations which do not have adequate conventional equipment. In return for satellite observations those countries provide the U.S. with basic terrestrial data. The free exchange of satellite data for worldwide terrestrial data is addressed in the international section.

Opportunities for the Future

I am confident that NOAA can maintain a strong and effective program of service to the Nation as the Federal Government tightens its belt under the President's vital program of economic recovery. But maintenance of NOAA's excellent record of service will require the setting of firm priorities, and determining funding for application experiments, satellite sensor development, data handling and distribution improvements. The National Earth Satellite Service (NESS) plans to meet rising user demand for cloud moisture context measurements by flying the experimental VAS in an operational mode, thus permitting simultaneous receipt of VAS sounding data and GOES satellite imagery. NESS, recognizing the need to build ground systems to handle rapidly mounting quantities of data, will expand its use of interactive processing while working closely with the NWS to improve weather analysis techniques, communications and display systems. NESS is also considering the introduction of new sensors to meet user demands for more detailed information.

SATELLITE INFORMATION IMPROVEMENTS

Centralized Storm Information System (CSIS)

Future improvements in the accuracy of warnings as well as day-to-day forecasts will be closely linked to advancing computer technology and our ability to capitalize on the latest technology in general. NOAA is in the process of replacing out-dated systems at the National Meteorological Center with a high-speed processor. We need to speed up assimilation of many different types of data and manipulate and display these data in a way that will clearly help the forecaster identify conditions requiring that public warnings be issued. We are proceeding with NASA on an operational demonstration of a Centralized Storm Information System (CSIS) at the National Severe Storm Forecast Center that will permit the comparison and rapid display of conventional and Doppler radar inputs, visual and infrared satellite imagery, and temperature and water-vapor profiles drawn from satellite data. CSIS will permit the forecaster to consider new information critical to the forecast and warning process integrally and systematically. The result will be timelier warnings, issued with greater confidence.

Satellite Weather Information System (SWIS)

More than a billion dollars has been spent to launch, operate and maintain meteorological satellites, but National Weather Service field forecasters are technically ill-equipped to use the incoming information. The Satellite Weather Information System (SWIS), to be deployed in the mid 1980's at NWS's 50 forecast offices around the country, will permit us to overlay the cloud motions depicted by satellite with surface and upper-air analyses—in effect providing an animated, three-dimensional picture of atmospheric motion. Continuous monitoring through SWIS will magnify forecasters' ability to track the evolution of small-scale, highly time-dependent weather conditions that foreshadow severe weather and flash flooding. An image processing, information display system which can integrate a large body of data rapidly is basic to advances in forecasting and warning. Indeed, in the San Francisco Bay area this has led to substantially improved detection of the peculiar atmosphere conditions associated with heavy fog, drizzle and low clouds.

System II

System II is an advanced information processing and display system designed to support operational demands of the advanced Forecast and Warning Offices and River Forecast Centers NOAA envisions for late in the 80's. System II will improve internal NOAA distribution of data-guidance products and satellite and radar imagery for rapid interface with observing and dissemination systems. It will permit local forecaster interactive processing in support of weather analysis and product preparation, formatting, scheduling and routing.

Satellite System Improvements

Through the Operational (meteorological) Satellite Improvement Program (OSIP), NASA supports development of new space systems. Starting in fiscal year 1984, funding requests for development of such new systems will appear in the NOAA budget request, although NASA will continue development activities on a reimbursement basis. The VAS demonstration program, begun following the launch of GOES-D in September 1980 will be completed in fiscal year 1983 through support of activities at the University of Wisconsin, Goddard Space Flight Center, and Wallops Island, Virginia. NASA will continue its support for development of the ozone-monitoring Solar Backscatter Ultravoilet (SBUV) instrument to be flown on the NOAA F satellite. This instrument is being developed under a prior NOAA/NASA agreement which called for NASA to fund development and prototype instrumentation and for NOAA to fund successive instruments.

Ocean Sensors

NOAA/NESS is currently conducting research on applications of data from the Coastal Zone Color Scanner (CZCS), an instrument which measures ocean color variations from Nimbus-7 satellite.

The Coastal Zone Color Scanner, A NASA-developed instrument, is the first space sensor designed specifically for measurements of ocean color. These measurements provide large-area maps of phytoplankton blooms, suspended particulates, and water masses and typed, and have application to NOAA interests in fisheries environmental assessment and prediction, coastal engineering and environmental quality monitoring.

NESS processed data from the Coastal Zone Color Scanner on NASA's Nimbus-7 for use in developing computer programs for deriving phytoplankton pigment in areas of the northwest Atlantic Ocean where extensive biological and optical data have been collected by ships. The agreement between data obtained from the scanner and optical and biological observations measured at the surface is excellent. Development of good atmospheric corrections for the scanner data has produced images showing detailed phytoplankton patterns associated with large-scale oceanic features such as currents and warm-core rings.

NOAA's Pacific Marine Environmental Laboratory also used scanner data to develop and refine programs for measuring particulate matter distributions from ocean surface color information. In particular, images over the North Pacific Ocean are being compared with shipboard measurements of chlorophyll and particle concentrations. The objective is to use satellite data to monitor ocean productivity and its effect on the carbon dioxide atmosphere-ocean exchange rate.

During 1982, NOAA's National Marine Fisheries Service (NMFS) will use ocean color and thermal data from the Nimbus-7 Coastal Zone Color Scanner to analyze ocean conditions. The scanner has the capability to detect chlorophyll concentration which, combined with temperature data, may provide more insight into the large scale distribution, abundance, and migration patterns of large pelagic species such as bluefin tuna, billfish and sharks.

WINDSAT

Of the three primary meteorological parameters required as input for numerical weather-prediction algorithms, the wind-field is both the most important and the least well-measured. A new concept, WINDSAT, would place an infrared Doppler lidar system in a polar-orbiting satellite to provide global wind-field observations to the surface or to the top of the cloud cover. Studies by NOAA (since confirmed by NASA and U.S. industry) indicate that such a system could measure the global wind-field, using the Doppler shift of echoes from atmospheric dust particles. NOAA's ground-based infrared Doppler lidar, now being tested, has provided real-time wind-field information for shuttle landings, and a variant could be tested on board the shuttle before launching on a NOAA satellite. NOAA, NASA and DOD will conduct joint workshops in June, 1982, to recommend further interagency study and development of the WINDSAT concept.

Search and Rescue

NOAA expects to participate in a NASA-sponsored international search and rescue demonstration project by flying an instrument aboard the polar-orbiting NOAA-E, to be launched approximately in February, 1983. France and Canada have contributed to the space hardware. We will cooperate with Norway, Japan and the United Kingdom in ground operations. The Soviet Union will launch two satellites, the first in 1982. Through this 15-month demonstration we expect to be able to locate downed airplanes or ships in distress within 10–12 hours, saving hundreds of search hours and many additional lives.

Solar Backscatter Ultraviolet Ozone Measurement System (SBUV-2)

NOAA operates a network of ozone monitoring stations which are part of the Global Ozone Research and Monitoring Program of the World Meteorological Organization. In addition, NOAA and NASA are jointly developing an operational version of a satellite instrument for global monitoring of both total column ozone and the distribution of ozone in the atmosphere. This instrument, the Solar Backscatter Ultraviolet Ozone Measurement System (SBUV-2), was developed and flight demonstrated by NASA, a contribution well known, I'm sure, to Senator Schmidt. It is scheduled to be launched in fiscal year 1985. NOAA is planning to install sensors on all polar-orbiters, starting with NOAA-H, to monitor ozone.

Atmospheric chemistry studies conducted by NOAA's Aeronomy Laboratory in Boulder, Colorado, include global measurements of stratospheric concentrations of fluorocarbons, nitrous oxide, methane, hydrogen, carbon dioxide, ozone and water vapor and the development of new chemical models to predict the effects of fluorocarbons and other man-made pollutants on the stratosphere. Better data will enable the Environmental Protection Agency to pursue the most effective, least costly pollution-control measures. The use of satellites as tools for carefully targeted basic research, research which is likely to pay for itself many times over, is just another service of NOAA.

Earth Radiation Budget Indication System (ERBIS)

The earth's weather is driven almost entirely by insolation—solar radiation which heats the surface of the planet and thus generates winds and oceanic currents. A minuscule portion of this influx is absorbed by plants and, of course, it is augmented to a still rather small extent by the combustion of fossil fuels. It is the difference between input and outflow of solar energy which is the key to long-range weather forecasting. The most reliable measurements of incoming solar radiation and reflected and radiated energy from the earth-atmosphere system are obtained from outside the atmosphere. A NASA experimental Earth Radiation Budget Indication System (ERBIS) will be launched with NOAA "F" and "G". NASA and NOAA will jointly analyze data from this instrument to determine the utility of ERBIS for long-range weather forecasting.

Satellite International Acitvities

Two foreign governments contribute instruments to NOAA polar orbiting satellites. The French National Center for Space Studies provides the ARGOS satellite data-collection system; the British Meteorological Office provides the Stratospheric Sounding Unit, a component of the TIROS Operational Vertical Sounder. There are 14 countries operating 275 platforms through the ARGOS system. Since the majority of the platforms are expendable, they must be periodically replaced, and more than 2,000 platforms have been used since its inauguration. Currently, the U.S. funded—Processing Agreement supports 145 platform-years. The telephone communications system at Suitland, Maryland, which permits direct access to disc files in Toulouse, France, is being used by 27 subscribers.

NOAA has served since 1968 as the lead agency for U.S. participation in the World Weather Program and its research component, the Global Atmospheric Research Program (GARP). Years of international planning led to the highly successful First GARP Global Experiment (FGGE), a 12-month period of intensive measurements of atmosphere and ocean by over 60 participating nations in 1979. The immense data set which resulted is just now being made available to researchers, who hope to improve their understanding of the general circulation of the atmosphere, so we can improve and extend weather forecasts and determine the causes of climatic variations.

More than 120 countries receive images and digital data directly from satellites operated by NOAA. Local governments, academic and scientific institutions, commercial companies and radio amateurs have bought or built stations to copy these direct-readout transmissions. Medium-resolution images from NOAA spacecraft are received in some 890 locations globally; high-resolution data can be obtained in 25 countries. Geostationary satellites provide weather facsimile broadcasts to nearly 30 countries in the Western Hemisphere and to Australia and New Zealand; three nations outside the United States also receive high-resolution images. The GOES Data Collection System is used by several countries in the Western Hemisphere for relay of environmental data from remotely located platforms.

Applications of these data overseas are primarily for storm detection and flight forecasting. Special-interest groups also receive and use the data for hydrology (river and flood forecasting, snow accumulation and melt), oceanography (sea-ice monitoring, ship routing, pelagic fish migration and harvesting) and other activities. Academic and scientific institutions obtain direct-readout transmissions for research.

Beginning in fiscal year 1983, NOAA will participate in a WMO-sponsored International Satellite Cloud Climatology Project designed to collect and process a five-year set of cloud-cover estimates from geostationary and polar-orbiting satellites in an effort to understand global climate. NOAA will collect data from its satellites and help develop methods for evaluating data overall.

NOAA participates in an informal, technical group known as the Coordination of Geostationary Meteorological Satellites (CGMS) through which the technical managers of agencies pursuing plans for national geostationary meteorological satellites discuss common interests relating to the design and operation of their spacecraft. The European Space Agency (ESA), Japan, the Soviet Union and India also participate. As a result of CGMS, there are four operating geostationary meteorological satellites—two lanuched by the U.S. and one each by ESA and Japan. While independently designed and developed, they have met common meteorological mission objectives and have produced certain compatible data products for worldwide users.

The current and prospective operators of national land remote-sensing satellite systems have established a similar informal technical group known as Coordination of Land Observation Satellites (CLOS). This group, in which NOAA and NASA participates along with representatives of France and Japan, is considering prospects for coordination of data products, satellite-to-ground telemetry and spacecraft orbits to ensure maximum compatibility among national land-observing satellite systems. During 1981, NOAA also coordinated U.S. participation in a series of regional meetings in Africa, Asia, and South America to inform prospective users of the planned national land remote-sensing satellite systems.

Images from the European weather satellite, METEOSAT, were first received by NOAA September 16, 1981, and became an operational product available to GOES-TAP users during October, 1981. These images, consisting of visible, infrared and atmospheric water-vapor data, provide excellent data for aviation and shipping in the eastern Atlantic, Europe, Africa, western Asia and the western Indian Ocean. These data are received at NASA's Goddard Space Flight Center and are relayed directly to NOAA, where they are made available for nationwide distribution.

EDIS used precipitation estimates from NOAA and GOES satellite images to support directly the Department of State's Agency for International Development disaster-assistance effort. These data are used to evaluate the effects of weather on crops in developing nations. EDIS provides weather-data support to 50 countries in Africa, Asia, and Central and South America. EDIS provides central information-exchange services and archival and data-dissemination services for the international Solar Maximum Year program. It also provides preliminary information exchange services and participates in planning for the Middle Atmosphere Program scheduled for 1982 to 1985.

NOAA serves as the U.S. focal point for contact with the World Meteorological Organization (WMO) and is vitally interested in WMO programs ranging from the service-oriented, such as the World Weather Watch, to climate research and to support activities such as training fellowships and the Voluntary Cooperation Program. NOAA is also active on the WMO Region IV Hurricane Committee, which contributes to warning effectiveness in the Caribbean, the Gulf of Mexico and along the Atlantic coast.

Landsat—$14,955M

NOAA is requesting an fiscal year 1983 appropriation of $14,955 million to support operation and management of the U.S. Landsat system. The total cost of Landsat operations in fiscal year 1983 is $24.74 million, but NOAA plans to recover the difference by selling Landsat data to both Federal and non-Federal users.

The difference between the amount NOAA is requesting and total Federal expenditures will be reflected in the budgets of Federal user agencies, including the Department of Agriculture, ($7,414), the Department of the Interior ($200K), and National Security agencies. These and other agencies will reimburse NOAA for their shares of Landsat operating costs. I urge Members of the Committee to help us obtain from your colleagues on other Committees the necessary budget support. The funds will be used to contract for management of the ground system at the Goddard Space Flight Center, to reimburse the Department of Interior's EROS Data Center at Sioux Falls, South Dakota, to pay for archiving of Landsat data and retrospective and other data services, and to cover NESS management of the program.

Landsat Operational Takeover

NOAA is on schedule to assume responsibility from NASA for operation of the new Landsat D system. Landsat D is the next generation, dedicated land remote-sensing satellite system designed to satisfy continuing requirements for timely and reliable data on the earth's resources. We expect that Landsat D, with its new, higher resolution Thematic Mapper (TM), an experimental sensor, will improve our ability to locate hard minerals, oil, gas and other non-renewable resources, to monitor and forecast global crop production, to manage renewable resources and to monitor major floods, earthquakes and other natural disasters.

Landsat D, which will carry the TM sensor in addition to the Multispectral Scanner (MSS), an operational sensor, is scheduled for launch in July of this year. Landsat D will be completed in mid-1983 and launched in 1985. NOAA will assume responsibility for operating the spacecraft and producing Landsat tapes and images as soon as acceptable performance criteria are met, and that should happen by January 31, 1983. NOAA will take over management of TM activity early in January, 1985, after NASA has completed a two-year R&D effort. Incidentally, we expect that TM will provide better coverage of the reflected visible spectrum than planned foreign installations.

On April 20, 1982, NOAA will host the first of five public meetings at locations around the country to inform interested parties of plans for implementing the operational system. The emphasis at these meetings will be on the alternate possibilities for routine collection of Landsat-D MSS scene data, the basic data set.

This is a critical issue for data users. The new MSS preprocessing ground system will allow an apparently adequate daily data handling budget, but it is still a limited budget. The key question is, "which scenes should NOAA plan to process?" This is a question for users to answer, and finding the answer will be the cental business of these meetings.

We have taken the following steps to assure a smooth transition of operating responsibility from NASA to NOAA:

Created a Landsat operations group in NOAA; staffing of this group is now 60 percent complete and it will be fully staffed 6 months before takeover;

Issued a request for proposals for a contractor to manage the spaceraft comand and control and data preprocessing functions at the Goddard Space Flight Center;

Reached agreement in principle with the EROS Data Center on NOAA's management of the data processing, delivery and billing functions there; and

Negotiated with NASA the terms for handing over the spacecraft and ground system to NOAA, including eventual responsibility for TM data, and for continued NASA assistance after the transition.

With NOAA's takeover of Landsat operations, the U.S. will have for the first time a single manager of the program—from spacecraft command and control to data production and dissemination. NOAA will have on-site managers at the EROS Data Center. Also for the first time, we will offer the public a system for ordering customized data sets for any time and place on earth:

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Recovery of Landsat operating costs will relieve taxpayers of the burden of subsidizing identifiable program beneficiaries. NOAA has advised the eleven foreign ground stations now receiving Landsat data directly that annual fixed-access fees will rise and that they will have to pay distribution fees based on the type

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With NOAA's takeover of Landsat operations, the U.S. will have for the first time a single manager of the program—from spacecraft command and control to data production and dissemination. NOAA will have on-site managers at the EROS Data Center. Also for the first time, we will offer the public a system for ordering customized data sets for any time and place on earth. The Landsat D system will provide preprocessed data to users like the Department of Agriculture within 48 hours. We anticipate that products from the EROS Data Center will be delivered to buyers on a more regular basis than is possible with the current experimental system.

Recovery of Landsat operating costs will relieve taxpayers of the burden of subsidizing identifiable program beneficiaries. NOAA has advised the eleven foreign ground stations now receiving Landsat data directly that annual fixed-access fees will rise and that they will have to pay distribution fees based on the type and number of products distributed by station operators. We are in process of drafting agreements for these stations incorporating the new prices.

We are creating a 15-member non-Federal Land Remote-Sensing Satellite Advisory Committee to advise NIOAA in planning for operational takeover and commercialization of Landsat. The Secretary of Commerce is in the process of making final selections for the Committee from the more than 160 nominations received to date. The Advisory Committee is expected to meet in June, 1982, and meetings will be open to the public; the minutes will be published.

Landsat Authorization Legislation

On May 5, 1981, Secretary Bladrige sent Congress an Administration-proposed bill to authorize Commerce to plan for the operation of a civil land remote-sensing system and to charge user fees, among other purposes. This bill would have authorized $2.1 million for fiscal year 1982 and such sums as may be necessary for fiscal year 1983. Now that the Administration's fiscal year 1983 budget has been transmitted to Congress, I request you consider that the interim authorization bill, previously submitted, incorporate the fiscal year 1983 budget request of $14.955 million for Landsat and pass the amended bill. On March 1, 1982 the Secretary of Commerce sent a letter to the Congress confirming the Administration's support of this legislation.

If it is enacted, NOAA will have clear authority to operate Landsat and to charge fees that recover all operational costs.

We anticipate forwarding for your consideration further amendments to this legislation after the Cabinet Council concludes its policy review of civil remote-sensing satellite commercialization of appropriate satellite services and would include a request for authority to transfer some or all of the Government's assets if to do so would be in the best interest of the Nation.

Cabinet Council on Commerce and Trade Policy Review

The CCC&T is examining two issues pertaining to civil operational satellites:

What is the best mechanism to implement the policy of transfer of civil land remote-sensing systems (Landsat) to the private sector as soon as possible?

Should we simultaneously transfer to the private sector both civil weather and land remote-sensing systems?

The Cabinet Council met on December 16, 1981, to discuss the first issue; consideration of the second was temporarily deferred. The Council requested and received additional information on benefits and related costs for Landsat-type data (i.e., what is long-term Landsat-type data worth to the Federal government and the Nation and how do benefits compare with costs?).

The Cabinet Council met again on March 17, 1982, but deferred making a decision pending receipt of further information on the national security implications of transferring civil weather satellites to the private sector. The Cabinet Council is expected to meet again on April 21 to consider the defense aspect of the issue. As soon as the Cabinet Council makes its decision, I will share that decision with the Committee. I am confident that in reaching a decision on how to commercialize remote-sensing systems, the element of competition will be a prime consideration.

Environmental Data and Information Service

NOAA's Environmental Date and Information Service (EDIS) acquires, interprets and disseminates global environmental data for use by commerce, industry the scientific and engineering communities, Federal, state and local governments and the general public. EDIS uses this information to assess the impact of environmental fluctuations on the national economy, global food supplies, energy development and consumption, and natural resources. Recently EDIS issued an analysis of the cost to the Nation of severe weather conditions in 1982.

EDIS provides retrospective global environmental satellite data to various clienteles, and it also uses them to develop value-added applications and assessment products and services for certain customers.

Domestic Satellite Information

The Satellite Data Services Division (SDSD) of EDIS' National Climatic Center disseminates data collected by NOAA's polar-orbiting and geostationary satellites. It provides some NASA experimental satellite data, and environmental data collected by the Defense Meteorological Satellite Program to a number of users. SDSD acts as the archive for data from NASA's experimental satellite, SEASAT, and from the Nimbus-7 Coastal Zone Color Scanner. SDSD's files contain observations (film imagery and numerical data tapes) collected by numerous environmental satellites dating back to the early 1960's.

International Satellite Information

Through the World Data Center Program, the EDIS National Geophysical and Solar-Terresterial Data Center (NGSDC) shares with NASA some of the responsibility for disseminating solar-terrestrial physics data collected by domestic and foreign satellites. NGSDC publishes summary data several months after observation for the benefit of the international scientific community, and relies on flier and catalog mailings to announce the availability of additional data to potential users.

Enhanced Information Services

Precipitation estimates from TIROS-N and GOES satellite imagery are used by EDIS' Center for Environmental Assessment Services (CEAS) to support the Agency for International Development's (AID) disaster assistance effort. These assessments evaluate the effects of weather variables on crops in developing nations. During 1981, EDIS provided assessments to 50 countries in Africa, Asia, and Central and South America.

The Agriculture and Resources Inventory Surveys Through Aerospace REmote Sensing (AGRISTARS) project began in 1979. During 1981, EDIS/CEAS evaluated yield models for wheat, sorghum, corn, soybeans, rice and cotton. Using advanced remote-sensing data obtained from NOAA and NASA satellites and selected remote-sensing data from aircraft, AGRISTARS seeks to develop an early warning system for conditions affecting crop quantity and quality, and to develop more accurate forecasts of commodity production in the major grain-producing nations.

EDIS/CEAS and NESS also developed techniques for using data from the polar-orbiters Advanced Very High Resolution Radiometer (AVHRR) sensor to complement LANDSAT multispectral scanner (MSS) data ion order to identify ares of crop stress and flooding. Initial results are encouraging and the ability of the meteorological satellite to cover the same area twice daily, is a great advantage in assessing crop condition.

In 1981, the EDIS National Geophysical and Solar-Terrestrial Data Center developed a computer program to identify the southern boundary of the aurora borealis from TIROS-N and NOAA-6 energetic particle measurements. The results will support the testing of a new USAF "over-the-horizon" radar system, whose performance would be affected by fluctuations in ionospheric conductivity.

Reorganization of NOAA

After careful assessment and consultation with the Secretary of Commerce, Administrator Byrne has proposed organizational changes that will help NOAA maintain and improve services, act in accordance with budget priorities, improve internal and external communications and reduce administrative overhead.

The proposed reforms are primarily aimed at restructuring technical functions designed to improve planning and monitoring of NOAA-wide activities, to improve the mechanism for rapid technical decisionmaking, and to ensure that NOAA's research directly assist upgrading of products and services and enhance the effectiveness of regulations. I also expect important program innovations.

NOAA has proposed cutting costs and improving dissemination of satellite information as well as terrestrial data by creating a new National Environmental Satellite, Data and Information Service (NESDIS). This organization would include many parts of NOAA including NESS, the NOAA Climate Program, the Center for Environmental Assessment Services, the Environmental Science Information Center, the National Climatic Center, the National Geophysical and Solar Terrestrial Data Center, and the National Oceanographic Data Center.

Our space-based and terrestrial data systems have the potential to provide information to help some of the most pressing resource management challenges facing the U.S. and the global community today.

There is wide concern here and abroad about the supply of minerals and foodstuffs. There is concern about natural and man-induced changes in the environment. Arguments—informed and uninformed—rage on all sides of these issues and decisions must be made. When decisions are made on the basis of inadequate information, the consequences can be disastrous economically, socially and environmentally. Shortages of vital resources may be assumed where none exist. Environmental damage may be assumed, and costly corrective measures taken, when the phenomenon is due to natural events or human events beyond our control. Expensive constraints may be placed on economic growth in response to incorrect assumptions or, worse yet, we may mandate excessive margins of safety in production methods, materials processing techniques and waste disposal.

In times of constrained resources efficiency must be sought everywhere, and that depends critically upon careful analysis and application of the best scientific information we can obtain. The proposed reorganization of NOAA components into one organization is designed to integrate disparate data-basis in various media and from a myriad of professional disciplines. If approved, geophysical, demographic, geographic, economic and other data basis will be rapidly accessible, efficiently organized, regionally updated, and quality checked.

There is just no denying the extraordinary impact of satellites on environmental and resource monitoring and upon meteorological science. Weather satellites have opened up entirely new horizons for advanced, accurate forecasting and warning over a period of several days. Before satellites, theory had outrun our observational capacity. Now the sheer mass of quantitative data is enabling us to refine dramatically our numerical models of how the atmosphere actually works. The equation of data and theory is neatly balanced.

In conclusion, I think I can safely say, without risk of hyperbole, that it would be hard to find a sounder investment of the taxpayers' money than the NOAA satellite programs I've briefly outlined here today. The services we provide are tangible, not theoretical. They make life easier for hundreds of millions of people here and abroad. They help boost the profitability and productivity of industry and agriculture. They help us exploit our resources more efficiently. They assist the control of pollution. The same thing can be said, a fortiori, for NOAA research, which painstakingly studies the atmosphere/hydrosphere/cryosphere complex and thus lays the groundwork for all future technological progress in the vast realm of earth and space.

I welcome your questions.

[Whereupon, at 4:56 p.m., the committee was adjourned.]

NOAA OMNIBUS AUTHORIZATION

WEDNESDAY, APRIL 21, 1982

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, D.C.

The committee met, pursuant to notice, at 9:48 a.m. in room 235, Russell Senate Office Building, Hon. Harrison H. Schmitt, presiding.

OPENING STATEMENT BY SENATOR SCHMITT

Senator SCHMITT. The hearing will come to order.

This morning we have the second of four hearings on the omnibus authorization for the National Oceanic and Atmospheric Administration.

The first hearing in this series was held Monday, April 19, and dealt primarily with an overview of NOAA's satellite services.

Prior to this year we have tended to consider NOAA programs only as they required formal reauthorization or in the context of appropriations. These programs, while important in their own right, have not collectively reflected the NOAA mission. In fact, the majority of the NOAA programs operate under continuing authorization and have not been reviewed by this committee.

Therefore, this year the Committee on Commerce, Science, and Transportation is considering an omnibus authorization bill for essentially all of NOAA's programs. Such legislation would assure this committee an opportunity to review regularly the research, service, and regulatory activities of the agency.

The NOAA programs being addressed this year fall under four general headings: Satellite services, atmospheric programs, ocean programs, and living marine resources programs.

The subject of today's hearing is NOAA's atmospheric program, which includes the National Weather Service, weather modification and atmospheric research programs, and the national climate program. Collectively, these programs account for a large part of the NOAA budget and personnel.

Under the administration's proposed fiscal year 1983 budget for NOAA, some $310 million would be allocated for atmospheric programs. Further, these programs touch on the lives of every citizen and every business in this country. Under these programs, NOAA reports and forecasts the weather, provides warnings of hurricanes, tornados and other severe weather phenomena, and manages the NOAA environmental labs.

These are also excellent examples of programs for which advances in science and technology hold the promise of new, better, and less expensive services for everyone.

In the foreseeable future it should be possible with the combination of existing types of services and the new satellite examination of solar influences on this great solar engine we call the earth to make not only scaled forecasts far better than they have been made in recent years, but also to begin to lay the groundwork for large-scale accurate climate forecasts.

The increasingly sophisticated use of satellite observation is providing insight about weather and atmosphere that was otherwise unavailable. Electronic data processing and new electronic management information systems hold promise of providing more users better, more reliable information more quickly than ever before.

The challenge, though, is to see that the promise is realized and fulfilled. It is in this spirit that we approach today's hearing. Our witnesses today are Dr. Anthony J. Calio, Deputy Administrator for NASA—here we go again—of NOAA; accompanied by Dr. Richard E. Hallgren, Director of the National Weather Service, and Dr. Ned Ostenso, Assistant Administrator for NOAA's research and development programs.

Dr. Calio will be joined in a panel by Dr. John Townsend, president of Fairchild Space & Electronics Co., and Dr. Wilmot N. Hess, Director of the National Center for Atmospheric Research. Testimony by Dr. Alan D. Hecht, Director of the National Climate Program, will follow that of the panel.

Senator Cannon.

OPENING STATEMENT BY SENATOR CANNON

Senator CANNON. Thank you, Mr. Chairman.

This past winter is another reminder of the impact weather has had on our daily lives. While it has become a cliche to say that everyone talks about the weather, but no one does anything about it, that really is not true. In fact, there are some promising techniques for weather modification that can disperse fog, increase rainfall, and someday minimize certain adverse weather conditions.

In my own State of Nevada, largely due to the fine efforts of the Desert Research Institute, we are finding that we can increase the winter snowpack in the Sierra Nevadas and thereby add to the spring runoffs. Other States are also trying to do something about water supply and other weather-related concerns.

Now, unfortunately, at the Federal level we do not have a national policy on weather modification. If anything, we spend huge sums of money on relief efforts caused by adverse weather, and next to nothing on ways to prevent or modify weather occurrences. We are poorly organized, and we do not adequately provide the very important research, that could lead to valuable weather modification techniques.

Last year I introduced S. 607, the Weather Modification Act of 1981. The bill, among other things, declares a national policy on weather modification and establishes a program of much needed research. S. 607 contains the best features of numerous studies and recommendations dealing with weather modification.

It is the same bill that was reported by the Committee on Commerce, Science, and Transportation when I was chairman, and it was passed by the Senate in the 96th Congress. There was no House action at that time. Just in the past month a comparable bill on weather modification was introduced in the House. I think it is now timely that we consider moving on this much needed and long overdue legislation.

I would like to make a second point about the impact of weather on our daily lives. Perhaps rather than daily lives, I should say the economy, which is in desperate straits at the moment, as we are all painfully aware.

Nevada, as you know, draws principally from tourism and agriculture for the base of its economy. Thus, we have a need for specific kinds of weather services, such as agricultural and fire weather, as well as aviation weather forecasts. Nevada has one of the highest levels of general aviation in the Nation as well as a growing and high level of commercial air traffic.

The State is located in an area of tremendously dynamic weather conditions which result from the eastward-moving weather systems over the Sierra Nevadas and other smaller mountain ranges. Because of these naturally occurring conditions, we are burdened with one of the highest weather-related aircraft accident rates in the country.

Last year the Administration proposed closing not only the Elko Weather Station, which provides locally adapted weather forecasts and warnings for a thriving but vulnerable cattle ranching area of Nevada, but also proposed downgrading the Reno Forecasting Office, moving the primary responsibility for developing forecasts for northern Nevada several hundred miles away, in Salt Lake City.

While we were successful in reinstating both weather operations, the Administration is back this year to propose the dismantling of the present system of regionally prepared aviation area forecasts, along with the termination of agricultural weather services and substantial cuts in fire weather efforts.

Other administration proposals, such as yet another year's delay in the procurement of the next-generation radar, with its entire country depending on weather radar dating from 1956, which has been cannibalized for years since there are no spare parts made for it anymore, are terribly shortsighted.

Mr. Chairman, the obvious increase in risk to life and property and the false economies of such actions are unacceptable, not only to Nevada but to the country.

I want to thank you for considering these issues and providing a forum for getting the facts on the record. Thank you, Mr. Chairman.

Senator SCHMITT. Thank you, Senator Cannon. We appreciate your interest and activities in this area.

Gentlemen, we will take your testimony in order as on the witness list. If you will try to limit your presentations to 5 minutes, it would be helpful. We will not be terribly rigid, but we would like to get through that and have time for questions. The longer written statements that you may have will be submitted for the record, without objection.

Our first witness—once again we welcome Tony Calio, the Deputy Administrator of NOAA. Tony.

STATEMENT OF DR. ANTHONY J. CALIO, DEPUTY ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE, ACCOMPANIED BY RICHARD E. HALLGREN, DIRECTOR, NATIONAL WEATHER SERVICE; AND NED A. OSTENSO, ACTING ASSISTANT ADMINISTRATOR FOR RESEARCH AND DEVELOPMENT

Dr. CALIO. Thank you, Mr. Chairman and members of the committee. It is indeed a pleasure to be here. Thank you for the opportunity to submit our prepared statement for the record.

I would like then to briefly summarize that statement and to point out, as you already have, that NOAA's atmospheric services mission includes monitoring and analysis of the atmospheric environment for the protection of life and property, the promotion of economic development, and the provision of technical data for the assessment of various factors affecting air quality.

In carrying out this mission, NOAA collects and interprets environmental data, predicts and issues timely warnings of environmental hazards, and facilitates socioeconomic decisions requiring knowledge of the atmosphere.

Most of NOAA's atmospheric science and service operations are conducted by the National Weather Service, the Environmental Data and Information Service, our Environmental Research Laboratories, and our National Earth Satellite Service. As you have indicated, I have discussed the National Earth Satellite Service contribution to our activities on April 19.

NOAA's atmospheric program embraces four elements: Warning and forecast services, climate services, air quality services, and solar-terrestrial services. Each of these elements has established a set of specific goals and research programs to support the service activities.

The largest element in NOAA is the National Weather Service. Its primary mission is to help insure the safety and welfare of the general public by the issuance of public forecasts and severe storm warnings and watches. The National Weather Service monitors the state of the atmosphere, rivers, and the oceans, operates national, meteorological, hydrological and ocean service systems, assists in the development of community preparedness programs for weather-related national disasters, and participates in international exchange of meteorological data.

To minimize the adverse effect of weather on the economy, the National Weather Service will continue to refine day-to-day terrestrial and marine forecasts, seeking longer range and improved accuracy.

Providing weather warnings and forecasts is a three-stage operation, including data acquisition, data analysis and information, and communication. Data acquisition comprises observation, collection and some processing of atmospheric, hydrologic, and oceanic data. It involves a variety of instruments able to measure surface weather, the state of the upper air, and conditions on and over world oceans.

Since the quantity and timeliness of data are the basis of a successful warning and forecasting system, we intend to introduce more automatic data reporting stations. In addition, we are tying to take advantage of new technologies of remote sensing, which are improving rapidly. These include doppler radar; remote-sensed vertical wind profiles, temperature, humidity, and total water vapor on a near-continuous timescale using microwave and infrared techniques; and third, satellite systems to monitor formation and movement of deep convection system, hurricanes, and frontal systems as well as to provide global multilevel coverage of winds.

The second stage of weather warning and forecasting operation is the product preparation, which requires data processing, analysis and the actual writing of weather bulletins. This activity is carried out by field forecast offices and three supporting guidance centers: the National Meteorological Center, the National Severe Storm Forecast Center, and the National Hurricane Center.

Continuous refinement of numerical models and other tools of the trade are resulting in small but measurable improvements in the warning and forecast service. Unfortunately, we still have a long way to go. We need more data and we need to process them more quickly. We need to design better models to predict the larger scale features of the weather.

Current mathematical prediction models of the atmosphere are reasonably accurate for a few days and show some potential for the 5-day range. The task now is to develop models that give us reasonable forecasts of so-called normal weather for periods out to 7 to 10 days and better hour-to-hour forecast of mesoscale and short-term events like tornados, hail storms, and flash floods. Lives and property depend upon these advances in the fundamental science of meterology.

One of the important aspects of weather forecasting is to be able to provide accurate and timely data to the forecaster. In an effort to do this, we are in the process of installing a system that will automatically provide field operations with various support services.

As you also know, the GAO has some questions about our activities associated with AFOS; we feel it is important that we exploit the current technology in place to be able to increase the capability of our forecasters.

We are sure, as we freeze the design and proceed toward the implementation of this system, it again will be over taken by technological capabilities being developed. In the future we will continue to take advantage of new technologies.

NOAA warnings and forecasts include specific hydrologic services. A nationwide system provides flash-flood watches and warnings based on the constant monitoring of river conditions, using radar, satellites and automated data collection networks. These data are constantly fed back into the AFOS system which I described.

In fiscal year 1983 a new version of the NOAA river forecasting system will be prepared for implementation in the field. It will facilitate exchange of data from satellites, computerized data collection systems, cooperative observers and from other agencies.

In conjunction with the development of a doppler radar system and in support of our flood and weather forecast abilities, we will complete expansion of the interim test network of digital radar processing equipment in the Midwest, primarily in the Arkansas River Basin and in Appalachia. Once this is completed, we will begin a pilot rainfall analysis program.

The third broad functional area in warning and forecasting is communications. It is important that we provide the transmission of information among centers having forecast, guidance, and dissemination responsibilities by means of landlines, radio, telephone, and microwave system and through computer processing operators. These activities are currently tied together very effectively through the National Weather Service.

NOAA's forecast and warning services in fiscal year 1983 will provide basic weather service to the Nation and continue research to improve surveillance of weather phenomena. We have steadily improved forecasting and warning support for hurricanes, tornados, major river and basin flooding, and flash floods. We are confident that these trends will continue.

In an effort to stay within the timeframe, Mr. Chairman, may I just make one other comment?

Senator SCHMITT. Go ahead.

Dr. CALIO. There are essentially three other components or three other services that we provide. One of these is the climate services. We have both a NOAA climate program and are responsible for implementing the national climate program, and Dr. Alan Hecht will discuss the national climate program later.

We also provide air quality services, which measure man's effect on the atmosphere.

And finally, we provide solar-terrestrial and space environmental services. This is a joint operation with the Air Force Air Weather Service, which provides around-the-clock forecasts and warnings of such solar activities as flares, proton events, and geomagnetic storms.

As you also know, we work very closely with many other agencies: With the Departments of Transportation and Defense, who contribute to the whole weather observation network. We are involved in the Clean Air Act. NOAA is responsible for monitoring the stratospheric ozone in cooperation with NASA, DOD, EPA, FAA, National Science Foundation, and Department of Agriculture.

We are also present in the international community and provide the U.S. permanent Representative to the World Meteorological Organization, and have been involved in the service-oriented World Weather Watch, climate research and support activities which include training fellowships and the voluntary cooperation program.

I would like to conclude my statement, Mr. Chairman, by stating that we are confident that NOAA can maintain a strong and effective program of service to the Nation as the Federal Government tightens its belt under the President's program of economic recovery, but maintenance of NOAA's excellent record of service will require constant attention to management efficiency and setting of firm priorities.

Accordingly, we will make some major management reforms over the next few years, which I hope to discuss with this committee in detail as those plans take shape. Thank you, Mr. Chairman, for the opportunity to be here.

[The statement follows:]

STATEMENT OF ANTHONY J. CALIO, DEPUTY ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE

Mr. Chairman and Members of the Committee. I am pleased to appear before you to discuss NOAA's atmospheric science and service operations.

The United States has the most varied severe weather of any nation in the world, with extremes ranging from severe droughts to flash floods, tornadoes, hurricanes and blizzards. This past January, flash floods and mudslides hit California, blizzards struck the midwest, killer tornadoes raked the Gulf states, and citrus crops froze in Florida. Winter struck again—with a vengeance—in April.

The general causes of this inclement action are well known. Due to the flat terrain over most of the eastern two-thirds of the Nation, moisture-laden currents of air from the tropical Gulf of Mexico frequently clash with dry, frigid air from the Arctic. Thus, a single storm system can affect different sections of the country in different ways.

But understanding the general causes isn't sufficient in forecasting actual weather. For that we must amass a mountain of atmospheric data, process it, interpret it and then disseminate the results to the public as rapidly as possible. Indeed, NOAA's meteorologists have significantly improved the quality of their forecasts in recent years. Temperature and precipitation estimates are 85 percent accurate, and five-day forecasts are as good as three-day forecasts were a decade ago. We have created a working computer model of the atmosphere as a whole, and additional advances in forecasting should be possible over the next decade.

NOAA scientists are engaged in basic research on the oceans and atmosphere trying to develop the basic understanding to improve our forecasting capability. They study the effects of CO^2 and flurocarbons, monitor acid precipitation, analyze pollutants in the marine environment and keep tabs on population changes among marine species. They prepare daily weather forecasts and longer-range climatic outlooks, warn of severe weather and assess natural and man-made changes in the environment. NOAA technicians produce and distribute nautical and aeronautical charts, collect, process and disseminate all types of atmospheric and oceanic information, and operate ships, satellites, buoys, aircraft and radars. NOAA protects U.S. living marine resources and their habitats, assists the development of new ocean industries and coordinates local efforts to protect shorelines under development.

These traditional services account for a major portion of the agency budget, and they must be justified largely by the benefits we derive from them. That's why NOAA is undertaking to re-assess its various missions and operations from top to bottom. We want to determine what is most important, what we can do best and what should be spun off to other agencies or to the private sector. We are committed to find more efficient ways to deliver services to the public.

We owe the taxpayer no less, and by becoming more efficient, we can facilitate the President's economic recovery program. It is my view that every agency of government—without exception—must realign its activities in such a way as to contribute to the success of that program. We in NOAA believe we can cut costs and still provide the essential services and research that constitute the backbone of the agency.

The Administration has provided new guidelines to follow as we re-evaluate our programs. The President is asking us to reduce Federal involvement in private-sector functions, transfer appropriate activities to State and local governments, recover costs that can clearly be allocated to users, eliminate programs of lower priority and reduce Federal overhead and personnel costs.

Unfortunately, there will never be enough money to perform all conceivable missions or to pursue all promising research leads. To provide growth for the higher priority programs, others may have to be reduced or eliminated. Congress and the Administration must together decide what the balance is to be. We in NOAA are convinced that our activities in the next fiscal year will make a significant contribution to economic recovery—and to sustained future prosperity as well—by helping the Nation manage its oceanic and atmospheric resources more efficiently.

NOAA Atmospheric Service Programs for Fiscal Year 1983

NOAA's atmospheric services mission includes monitoring and analysis of the atmospheric environment for protection of life and property, the promotion of economic development and the provision of technical data for the assessment of various factors affecting air quality. In carrying out this mission, NOAA collects and interprets environmental data, predicts and issues timely warnings of environmental hazards, and facilitates socio-economic decisions requiring knowledge of the atmosphere. Most of NOAA's atmospheric science and service operations are conducted by the National Weather Service, the Environmental Data and Information Service, our Environmental Research Laboratories and our National Earth Satellite Service. The NESS contribution was elaborated in testimony I presented before this Committee on April 19.

NOAA's atmospheric program embraces four elements: warning and forecast services, climate services, air quality services and solar-terrestrial services. Each of these elements has established a specific goal and a research program to support it.

1. WARNING AND FORECAST SERVICES (FISCAL YEAR 1983, $281.0M)

The largest and most important atmospheric element of NOAA is the National Weather Service (NWS). Its primary mission is to help ensure the safety and welfare of the general public by issuance of public forecasts and severe-storm watches and warnings. NWS monitors the state of the atmosphere, rivers and oceans, operates national meteorological, hydrological and oceanic service systems, assists in the development of community preparedness programs for weather-related natural disasters and participates in international meteorological data exchanges.

To minimize the adverse effect of weather on the economy NWS will continue to refine day-to-day terrestrial and marine forecasts, seeking longer-range and improved accuracy. We will provide the basic data to maintain and expand forecast services for food, feed and fiber production, but we believe providing tailored forecasts for farmers should be a function of the private sector. We will create more accurate and longer-range river-flow forecasts and collaborate with other agencies to improve water management. Hydropower production planning depends, of course, upon both longer-range and tailored regional forecasts.

NOAA is conducting research to improve warning lead-time for short-range phenomena, to predict intermediate weather in the one-to-two week time-frame more accurately and to upgrade forecasts of longer-range and broader-scale frontal movements. Our first priority is to better understand severe convective weather systems—hail, tornadoes, high winds heavy rains, flash floods and hurricanes—which account for a very large percentage of all weather-related losses of life and property.

Changes in hurricane intensity have always been one of the most difficult severe-storm features to forecast. Recent analyses of data from NOAA aircraft flying through hurricanes have led to the development of a new empirical model of cyclic intensity fluctuations. Further study will help us predict the start of such cycles.

We propose to reorganize in such a way that we can cut expenditures but still provide the basic weather-data needs of the public and specific users such as those in agriculture and forestry. The Aviation Weather Program will be funded by user fees and the cost of providing dedicated aviation weather services will be reimbursed from the Airport and Airway Trust Fund. Additional savings will be achieved by modernizing management practices and centralizing some aviation forecast services. Indeed, a higher level of operational efficiency will help us offset the cost of maintaining and upgrading basic warning and forecast capacity.

Weather warning and forecasting is a three-stage operation, including data acquisition, data analysis and information communication.

Data acquisition

Data acquisition comprises observation, collection and some processing of atmospheric, hydrologic and oceanic data, employing a variety of instruments able to measure surface weather, the state of the upper air, and conditions on and over the world oceans. Since the quantity and timeliness of data are the basis of a successful warning and forecast system, we intend to introduce more automatic data-reporting stations.

In addition, the technologies of remote sensing are improving rapidly. These include (1) Next Generation Weather Radar (NEXRAD), (2) remotely sensed vertical profiles of winds, temperature, humidity and total water vapor on a near-continuous time-scale using microwave and infrared techniques (PROFILER), and (3) satellite systems to monitor the formation of deep convection movements, hurricanes and frontal systems as well as global multilevel coverage of winds (WINDSAT).

The NEXRAD system will significantly boost the performance of weather radar through Doppler technology. The three principal agencies in the NEXRAD program (NOAA, DOD and FAA) agree that Doppler weather radar should be incorporated into the national network and they have established common operational goals and criteria for detection and measurement of severe meteorological phenomena, issuance of hazardous weather warnings, distribution and display of weather radar information and high operational reliability.

The Nation is in urgent need of the new Doppler technology, especially in the severe weather belt, where lost productivity and spiraling property losses justify the most effective warning system possible. Tests have shown that Doppler radar offers marked improvement over conventional equipment for early and accurate identification of thunderstorms and tornadoes. Meteorologists and radar operators can study the dynamics of severe thunderstorms, mesocyclones, clouds and, in some cased, clear air turbulence—without having to fly through it. Warning lead-time increases from 0 minutes to almost 30 minutes, and the number of false alarms drops about 40 percent. NEXRAD is also less labor-intensive and thus cheaper to operate.

The current NWS upper-air network uses radiosondes to obtain profiles of winds, temperatures and humidity once every twelve hours at locations spaced roughly every 350km across the U.S. This network is very inadequate for accurate forecasting of local weather conditions, for example, thunderstorms, which typically have dimensions of less than 50 km and usually last only an hour or two. The goal of NOAA's PROFILER program is to provide a system which will gather, automatically and under virtually all weather conditions, continuous profiles of wind, temperature and humidity, with accuracies comparable to or better than the radiosonde. The operational impact of PROFILER is expected to be significant, primarily because for the first time upper-air data will be available continuously. NMC synoptic-scale predictions will be made much more frequently than once per twelve hours, with data averaged in time and therefore more representative, and that includes the rates of change. Even more important, PROFILER will complement satellite sounding data. The combination of PROFILER plus satellite data offers an opportunity to initialize mesoscale models, and hence provide short-term local weather forecasts that are considerably more accurate and more detailed. The use of PROFILER in the PROFS system will prove the utility of real-time, continuous vertical data for better severe-weather forecasting.

Of the three primary meteorological parameters required as input for numerical weather prediction algorithms, the wind field is both the most important and the least well measured. A new concept, WINDSAT, would operate an infrared Doppler lidar system in a polar-orbiting staellite to provide global wind-field observations to the surface of the earth or to the top of the cloud cover. Studies by NOAA (since confirmed by NASA and U.S. industry) indicate that such a system could measure the global wind field, using the Doppler shift of echoes from atmospheric dust particles. NOAA's ground-based infrared Doppler lidar, now being tested, has been used to provide real-time wind-field information for landings of the NASA shuttle. It will provide information for designing a satellite payload which could be tested on board the shuttle before launching on a NOAA satellite. NOAA, NASA and DOD will conduct joint workshops in June, 1982, to develop recommendations for an interagency R&D program to elaborate the WINDSAT concept.

Data analysis

The second stage of weather warning and forecasting is documentation, which requires data processing and analysis and the actual writing of weather bulletins. This activity is carried out at three major forecast guidance centers—the National Meteorological Center, the National Severe Storms Forecast Center and the National Hurricane Center. Continuous refinement of numerical prediction models and other tools of the trade are resulting in small, but measurable, improvements in the warning and forecast program.

Unfortunately, we still have a long way to go. We need more data and we need to process them more rapidly. We need to design better models to predict the larger-scale features of weather systems. Current mathematical models of the atmosphere are quite predictive for a few days and show some potential in the five-day range. The task now is to develop models that give us reasonable forecasts of so-called normal weather for periods out to seven to ten days and better hour-to-hour forecasts of mesoscale and short-term events like tornadoes, hailstorms and flash floods. Lives and property depend upon these advances in the fundamental science of meteorology.

Future improvements in the accuracy of warnings as well as day-to-day forecasts will be closely linked to advancing computer technology and our ability to capitalize on the latest technology in general. We are replacing out-dated systems at the National Meteorological Center with a high-speed processor. We need to speed up assimilation of many different types of data and manipulate and display these data in a way that will clearly help the forecaster identify conditions requiring that public warnings be issued. We are proceeding with NASA on an operational demonstration of a Centralized Storm Information System (CSIS) at the National Severe Storms Forecast Center that will permit the comparison and rapid display of conventional and Doppler radar inputs, visual and infrared satellite imagery, and temperature and water-vapor profiles drawn from satellite data. CSIS will permit the forecaster to consider new information critical to the forecast and warning process integrally and systematically. The result will be timelier warnings, issued with greater confidence.

In a complex society like ours, adverse severe weather can cause heavy financial losses. Consequently, there has been a rising demand in recent years—from a variety of clientels—for more timely warnings of destructive weather phenomena and for more accurate forecasts of ordinary weather. To meet the public's requirements, NOAA has made some major improvements in its warning and forecast systems. The most important of these has been the Automation of Field Operations and Services (AFOS) program.

Now, GAO said that AFOS would be obsolete by the time it was completed. Technically, that's true. The engineers are forever coming up with innovations that render existing methods and equipment obsolete. But at some point you have to bite the technological bullet, freeze design, and go with what you have. You can't wait around for an ideal system.

AFOS employs a network of minicomputers and TV-type displays at about 200 National Weather Service field offices which automate data communications, storage and display and message preparation and dissemination. Professional staff are liberated from routine manual tasks so they can concentrate their effort on analysis, forecasting and service functions. AFOS hardware and software have been installed at the planned offices, evaluation of system functions has been completed, field personnel have been trained in the use and maintenance of the system, and logistics, network operations and management support are in place. Demonstrations have been completed for all four contiguous NWS regions. Formal commissioning of the system across the country is scheduled for the end of fiscal year 1982. Additional improvements are planned for 1984 by adding remote terminals at about 100 smaller Weather Service offices, interfacing with observing systems, providing additional memory and streamlining system software.

The AFOS program is an essential first step toward major improvements in the forecast and warning of severe weather phenomena that threaten life and property. It establishes a framework for much more effective use of advanced satellite and radar data later in this decade.

At that point we will begin introducing what we call System II, an information processing and display system designed to support operational demands of the advanced Forecast and Warning Offices and River Forecast Centers we envision for the late 80s. System II will improve internal NOAA distribution of data-guidance products and satellite and radar imagery for rapid linkage with observing and dissemination systems. It will permit local forecaster interactive processing in support of weather analysis and product preparation, formatting, scheduling and routing. However, it will not meet the needs of the specialized regional and national forecasting operations of NMC, NSSFC or the proposed Area Forecast Centers.

NOAA warnings and forecasts include specific hydrologic services: a nationwide system provides flash-flood watches and warnings based on constant monitoring of river conditions using radar, satellites and automated data-collection networks. These data are constantly fed back into the AFOS system.

A major problem in preparing flash-flood forecasts and warnings is that heavy local rainfall, capable of causing flooding in headwaters and small streams, can fall undetected inside the existing rainfall observation network. Manual procedures are time consuming and limit the amount of information that can be assimilated. Self-reporting rain gauges and automatic data-processing capability are needed to shorten the time required to diagnose potential danger. Finally, the warnings need to be disseminated rapidly to threatened communities, and status reports concerning onset and severity of flooding are needed from flood sites. NWS field offices and state and county Emergency Operations Centers need to communicate quickly during assessment, warning and emergency response phases of the event. Communications today consist mainly of telephone circuits, which are prone to failure during emergencies.

In fiscal year 1983 a new version of the National Weather Service River Forecasting System will be prepared for implementation in the field; it will facilitate exchange of data from satellites, computerized collection systems, cooperative observers and other agencies. In conjunction with the development of NEXRAD (Next Generation Weather Radar) and in support of our river and flood forecast responsibilities, we will complete expansion of an interim test network of digital radar-processing equipment in the midwest, primarily the Arkansas River Basin, and in Appalachia. Once it is completed, we will begin a pilot rainfall-analysis program.

Another innovation in this service is the Integrated Flood Observing and Warning System (IFLOWS). Flash floods have drowned 2000 Americans over the last ten years and destroyed $2 billion in property last year alone. More than 85 percent of presidential disaster proclamations, with their attendant costs in emergency aid, are connected with one kind of flooding or another. We just can't afford such losses.

IFLOWS delivers, in near real-time, rainfall reports from critical locations in headwaters areas and small stream basins. It supplements a network of volunteer observers who phone in data on rainfall and other phenomena from hundreds of locations around the country. These observations are transmitted to field offices of the National Weather Service and to state and county emergency service agencies responsible for local self-help, flood-warning and response programs. IFLOWS provides data processing and display capability to NWS Offices and state and county Emergency Operations Centers to expedite the analysis of rainfall and stream-level data and the diagnosis of flood threats. The purpose is to provide more timely and site-specific warnings of flash floods in the 30-minute to 3-hour range.

Thus, IFLOWS helps the National Weather Service meet a high priority mission objective—protection of life and property. As the system is tested and proven it can be adapted to other flood-prone regions of the country.

Meanwhile we must do more to alert the public to the dangers posed by flood waters. More than 20,000 communities and recreational areas have been identified by the Federal Emergency Management Agency (FEMA) as being flash-flood prone. Widespread urban development and paving of flood plains promote faster runoff. The removal of vegetation augments flow rates of small streams, and bridges, culverts and buildings often impede the natural flow of water. In mountain country, more and more vacationers are crowding areas which cannot handle major surges of rainwater.

National Flash Flood Awareness week is a special effort by NOAA and FEMA to help increase public awareness of flash flood dangers and how to avoid them. Both agencies are working closely with local communities, schools and goverment agencies to conduct educational and informational events during the week of May 17–23, 1982.

Right now, weather forecasters at NOAA's National Weather Service must work with observations collected from stations often positioned 100 miles apart. Yet many severe storms can occur in regions only 50 miles square. PROFS can help us bridge this observational chasm. As a first step, NOAA scientists have assembled all of the forecaster's present sources of information and integrated them into a single, automated, easy-to-read display system. Current plans are to have an interactive demonstration system available by 1983 which can be used to develop workable models of mesoscale weather phenomena and gradually be introduced at local Weather Service offices.

More than a billion dollars has been spent to launch, operate and maintain meteorological satellites, but National Weather Service field forecasters are technically equipped to use only a small portion of the incoming information. The SWIS system, to be deployed in the mid 1980's at our 50 forecast offices around the country, will permit us to overlay the cloud motions depicted by satellite with surface and upper-air analyses. Continuous monitoring through SWIS will magnify forecasters' ability to track the evolution of small-scale, highly time-dependent weather conditions that foreshadow severe weather and flash flooding. The use of an image-processing, information display system which can integrate a large body of data rapidly is basic to advances in forecasting and warning.

NOAA is conducting a number of research programs to enlarge our knowledge of basic meteorological processes, including studies of ice as a factor in precipitation efficiency (ICP), the dynamics of cloud formation (CCDMP) and better methods for predicting hurricane landfall. On the development side, we intend to provide more complete data sets for severe storm analysis (SESAME). Ultimately, these initiatives will pay off in more accurate forecasts and faster and faster warnings of hazardous conditions.

Communications

The third broad functional area in weather warning and forecasting is communications—the transmission of information among centers having forecast, guidance and dissemination responsibilities, by means of land-line telephone, radio, radiotelephone, microwave and computer processing operations. The final step, dissemination of our weather intelligence to the public, to industry, and other groups is a collaborative effort among NWS, other Government agencies and the private sector, especially the mass media. NWS is capable of providing this information in a timely manner to the media but it is largely up to them to print or broadcast it. To help radio and TV weathercasters better understand Weather Service operations and to assure accurate transmission of information to the public, NOAA conducts series of workshops each year. These focus upon hurricanes, severe storms and winter storms, and serve not only to bring weathercasters up to date on operational and research developments, but also to establish beneficial relationships between weathercasters and NOAA personnel. In the seven years this program has been under way more than 500 weathercasters, many from major metropolitan areas, have attended the workshops.

We have completed implementation of the NOAA Weather Radio system and are in the process of improving the NOAA Weather Wire Service. Direct dissemination via cable-TV is being studied as well. Our forecast and warning program can only be successful if it is supported by efficient communication and dissemination systems. AFOS, which I discussed earlier, represents a quantum leap in data communications. Even though it is not fully implemented we are already realizing significant benefits.

We are also working to improve graphic presentation and voice generation, and to automate product formulation, all of which promise to make weather warnings and other information available to more people, more rapidly and more intelligibly, than ever before.

NOAA's Forecast and Warnings Services in fiscal year 1983 will provide basic weather service to the Nation and continue research to improve surveillance of weather phenomena. We have steadily improved forecast and warning support for hurricanes, tornadoes, major river-basin flooding and flash floods, and we are confident that these trends will continue.

2. NOAA CLIMATE SERVICES (FISCAL YEAR 1983, $26.0M)

NOAA provides climatic data and conducts research to discover the basis of climate dynamics and variability.

Better understanding of climate variability will help us protect life and property, improve the allocation of natural resources, promote continued econonic growth and minimize environmental losses. It has major domestic and foreign policy implications. The ability to predict significant departures from normal climate, and to provide early assessments of the impact of climate anomalies, can provide U.S. policymakers at all levels of government and in the private sector with the lead-time they need to make sound policy decisions.

NOAA's Environmental Data and Information Service (EDIS) acquires from collecting agencies (including the National Weather Service) and disseminates selected global environmental data (atmospheric, marine, solid-earth and solar-terrestrial) to meet the needs of commerce, industry, agriculture, the scientific and engineering communities, the general public and Federal, State and local governments. EDIS also uses this data to assess the impact of climatic variations on the national economy, food and energy supplies, telecommunications, natural resources and human health.

For example, EDIS has developed national models which describe the impact of temperature anomalies on energy demand for heating and cooling, and now issues monthly and seasonal projections of energy demand for multistate regions. The Department of Energy and other Federal agencies, State energy agencies and industry find these projections essential for rational energy planning.

Measurements of the atmosphere, hydrosphere and cryosphere over long periods of time provide a data base for climatologists and resource managers in energy, water supply and agriculture; architects and builders must also consider their ramifications.

Basic climate data and information services are provided by the National Climatic Center (NCC), the National Oceanographic Data Center (NODC), and the National Geophysical and Solar-Terrestrial Data Center (NGSDC). Standard data summaries and publications are produced in a generally acceptable time frame; however, there is a rapidly growing requirement for faster user-access and specialized data and information services. Because of the huge backlog of unprocessed historical data and obsolete formats, these individualized services are costly to the requester and response time is slow.

During fiscal year 1983, EDIS will develop and implement computerized quality-control systems and data-base management techniques to provide rapid access to key climatic data sets. In addition, selected oceanographic data will be added to the existing climate data base, and a comprehensive National Environmental Data Referral Service (NEDRES) catalog will be developed.

Resources made available through the automation of incoming current data will be directed toward processing the historical backlog. However, with available resources, we may reach the early 1990s before all of the historical data can be inventorized, quality-assured, digitized and made available to users cheaply and quickly.

Results thus far of NOAA's Equatorial Pacific Ocean Climate Studies (EPOCS) and the Global Weather Experiment indicate that further investigation may enhance forecasting over a wider geographic area and longer time-domain, even several seasons in advance.

Scientific long-range weather or climate forecasting is severely handicapped because we lack historically extended data-sets from which to construct a theoretical base for the analysis of ocean-atmospheric processes. We do know that oceans and atmosphere are a closely coupled system. The ocean stores and gives up heat and water vapor to fuel the circulation of the atmosphere, while the atmosphere drives open-ocean currents and influences the flux of radiation from the ocean surface. Understanding the physics of this system is vital to improvements in forecasting hurricanes, for example, and in predicting global fluctuations of climate over the decades.

Extended data-sets now being gathered by NOAA will enable us to develop hypotheses on ocean and atmospheric interactions that may lead to useful long-term climate forecasts. We are examining historical Chinese land records and data and the flow of the Nile River. We are processing historic ship data-sets and analyzing deposits in the cores of glaciers. EPOCS is trying to find relationships between large-scale sea surface and climate anomalies. The Sub-Tropical Atlantic Climate Studies (STACS) program is measuring ocean mass and heat flux north from the Equator. And we hope the Global Weather Experiment will demonstrate that complete world-wide data sets actually improve weather forecasts.

A number of long-term observations, including those made by NOAA's Mauna Loa observatory in Hawaii, have indicated that the CO_2 concentration in the atmosphere is rising continuously. NOAA's Geophysical Fluid Dynamics Laboratory (GFDL) at Princeton has developed a coupled ocean-atmosphere-cryosphere model in a major effort to investigate future climatic implications of this increase. Special emphasis has been placed on the study of CO_2-induced changes in hydrologic variables. Preliminary results show that in response to higher CO_2 concentration average soil moisture decreases significantly in middle and higher latitudes during the summer. Detailed analysis of the soil-water budget indicates that CO_2-induced summer dryness results from earlier termination of the snowmelt season as well as from the earlier occurrence of the normal spring-to-summer reduction in rainfall. Research will continue on the implications for agriculture of the CO_2-induced drop in soil moisture. To determine the global CO_2 budget, we are exploring the response of the upper oceans to radiative CO_2 warming in the atmosphere and trying to determine the capacity of the oceans to absorb this potential gas overload.

Over the next ten years, better understanding of climatic processes and more complete global atmospheric and ocean data from new remote-sensing systems may bring, us closer to science-based season-to-season, year-to-year, decade-to-decade climate forecasts.

In fiscal year 1983, NOAA proposes to continue climate research at the base level in the amount of $10.0M. Studies will focus on the sensitivity of climate to human activities, especially those which affect atmospheric levels of carbon dioxide and ozone; effects of equatorial and subtropical sea-surface temperatures on climate; development of models of the climate; and determination of the theoretical and practical limits of long-range forecasts.

You will hear more about our National Climate Program from its new director, Dr. Alan Hecht, who has a separate statement for you.

3. AIR QUALITY SERVICE (FISCAL YEAR 1983, $8.0M)

Air pollution began to be seen as a serious problem in the '60s and '70s, and a national movement arose which demanded that automotive and industrial pollution be curbed. Unfortunately, at the beginning we could only speculate about how pollutants were transported in the environment. If we acted precipitately to control them, whole industries could be jeopardized. Today, thanks to research and continuous monitoring of the atmosphere, we can better protect public health, crops, materials and the natural environment without damaging the economy. Indeed, doing so benefits the economy.

NOAA has an important role to play in this process. Our Air Quality Service provides advisories on incidents of large-scale atmospheric stagnation to state and local air pollution and agencies. We monitor the global concentration of carbon dioxide and ozone and predict the trajectories of contaminated air masses, including radioactive debris. We conduct studies on physical processes involved in the transport, diffusion, transformation and disposition of air pollutants, especially those believed to cause acid precipitation.

NOAA proposes $8.0 million for such research in fiscal year 1983, including an additional $300,000 to fund acid precipitation studies under the National Acid Precipitation Program (Title VII of the Energy Security Act of 1980).

Acid rain has been documented in eastern North America and northern Europe. Its coincidence with man-made sources of sulfur oxide and nitrogen oxide points the finger at utilities, transportation and industry as the source. However, NOAA has measured acidity in rains remote from man-made sources in locations such as the NOAA Mauna Loa Observatory on Hawaii, Bermuda and Amsterdam Island in the southern Indian Ocean. In these remote locations, we find rain acidity to be surprisingly high, at times as high as in eastern North America. This suggests either that acidic materials can be transported great distances or that there are significant natural precursors.

The facts as ultimately established will determine how we solve the problem. But we need to gather those facts now before it becomes insurmountable and poses some serious, as yet unknown threat to the natural world we depend upon for life and prosperity. Science requires us to be patient and to keep on looking for that obscure datum which makes sense of all the others. I am confident that acid-rain research will pay off; in fact, it's a classical example of science in service to society.

Current and planned research includes continuation of U.S. and global monitoring activities to measure the chemical composition of precipitation, development of a new dry-deposition collector, a Canadian-U.S. intercomparison of precipitation collectors, improvements of atmospheric transport models and experiments with the perfluorocarbon tracer system to verify air pollution and transport models. NOAA co-chairs the Interagency Task Force on Acid Precipitation which includes all Federal agencies having programs or interests in acid rain. The Task Force is completing a plan for a national research program. NOAA scientists are also members of joint U.S. and Canadian working groups preparing papers to support development of a transboundary air quality agreement.

Atmospheric chemistry studies conducted by our Aeronomy Laboratory in Boulder, Colorado, include measurement of rate-constants for chemical reactions in which fluorocarbons are implicated (a potential threat to the ozone layer shielding earth from damaging ultraviolet radiation); use of the laser magnetic-resonance detection system developed in the Laboratory to measure reaction rates; global measurements of stratospheric concentrations of fluorocarbons, nitrous oxide, methane, hydrogen, carbon dioxide, ozone and water vapor; absorption spectroscopy measurements of important trace constituents in the atmosphere at different locations and in different seasons; and the development of new chemical models to predict the effects of fluorocarbons and other man-made pollutants on the stratosphere. Better data will enable EPA to pursue the most effective and least costly pollution-control measures. Again, we see the vast social significance of carefully targeted basic research, research which is likely to pay for itself many times over.

NOAA operates a network of ozone monitoring stations which are part of the Global Ozone Research and Monitoring Program of the World Meteorological Organization. In addition, NOAA and NASA are jointly developing an operational version of a satellite instrument for global monitoring of both total column ozone and the distribution of ozone in the atmosphere. This instrument, the Solar Backscatter Ultraviolet Ozone Measurement System (SBUV-2), was developed and flight demonstrated by NASA, a contribution well known, I'm sure, to Senator Schmidt. It is scheduled to be launched in fiscal year 1985.

4. SOLAR-TERRESTRIAL SERVICES (FISCAL YEAR 1983, $2.0M)

NOAA provides a number of space environmental services, including forecasts, alerts and warnings of solar disturbances, which can affect electrical power and telephone transmission, air navigation, military surveillance and tracking systems, nuclear event detectors, warning radars, civilian and military satellites, energy exploration and even gas and oil pipeline operations.

The Space Environment Laboratory conducts research to improve the accuracy and timeliness of their services, indicating an examination of fundamental physical processes responsible for the observed solar energy release, propagation of this energy the near-earth environment, transfer of such energy into the earth's magnetic field, and its behavior and effects in the upper atmosphere and magnetosphere.

The Space Environment Services Center, jointly operated with the USAF Air Weather Service, provides round-the-clock forecasts and warnings of such solar activity as flares, proton events and geomagnetic storms. Users include the Departments of Defense, Energy and Transportation, NASA and private companies in public power, communications and aviation. NOAA proposes to continue critical services in the space environment program but reduce lower-priority activities and solar-terrestrial research supported directly by NOAA.

NOAA interagency activities

NOAA is a service-oriented organization which participates in many cooperative interagency activities.

NOAA, Transportation and Defense contribute weather observations to form a common base of information from which applied forecasts are derived. For example, of 1276 land-surface stations, NOAA provides 528, DOT 520 and Defense 228. In fiscal year 1982 NOAA will reimburse other agencies $93 million for special operations and research services, and it will receive $25 million for providing services of its own.

Under the Clean Air Act Amendment of 1977 (Public Law 95–95) NOAA is responsible for monitoring of stratospheric ozone in cooperation with NASA, DOD, EPA, FAA, the National Science Foundation and the Department of Agriculture. We cooperate with the Department of Energy in research on potential climatic changes caused by the build-up of carbon dioxide in the atmosphere. Our Space Environment Services Center (SESC), operated jointly with the U.S. Air Force, predicts the effects of solar disturbances on the Earth's atmosphere that impact the missions of DOD, NASA, FAA and others.

In cooperation with the Bureau of Reclamation and the National Center for Atmospheric Research we have studied weather modification techniques. NOAA's hurricane forecasting, warning and research program is supported by U.S. Air Force weather reconnaissance aircraft. In wartime or a national emergency, the President can transfer NOAA commissioned officers, vessels and stations to the military departments. We cooperate with the National Science Foundation in ocean-atmosphere interaction studies, and evaluate the effects of marine oil and hazardous materials spills in cooperation with EPA and under the aegis of the Coast Guard.

NOAA international activities

International cooperation is a common thread running throughout NOAA's atmospheric science and service programs. Indeed, the Weather Service began exchanging data with other nations decades ago, and this cooperation has grown enormously in recent years as nations became more interdependent. A strong institutional base has been established for even closer cooperation in future from which all parties will derive benefits.

The Committee may be interested to know that the U.S. employs 5,000 people in its weather services, compared with 2,500 in the U.K., 2,300 in the Federal Republic of Germany, an equal number in France and 100,000 in the U.S.S.R. Considering that Europe seldom experiences flash floods, and is not affected by tornadoes, or hurricanes, it is safe to say that we are getting much more service for our dollar. We make better use of technology and the human factor is more efficient. Indeed, we spend approximately $230 million per year on weather forecasting and warning, about a dollar per capita versus, two or three times that much in almost every other country.

NOAA serves as the U.S. focal point for contact with the World Meterological Organization (WMO). The U.S. participates in WMO programs ranging from the service-oriented, such as the World Weather Watch, to climate research, and to support activities such as training fellowships and the Voluntary Cooperation Program. NOAA is also active on the WMO Region IV Hurricane Committee which contributes to coordinated warnings in the Caribbean, the Gulf of Mexico and along the Atlantic coast.

NOAA has served since 1968 as the lead agency for U.S. participation in the World Weather Program and its research component, the Global Atmospheric Research Program (GARP). Years of international planning led to the highly successful First GARP Global Experiment (FGGE), a 12-month period of intensive measurements of atmosphere and ocean by over 60 participating nations in 1979. The immense data set which resulted is just now being made available to researchers who hope to improve their understanding of the general circulation of the atmosphere, so we can improve and extend weather forecasts and determine the causes of climatic variations.

GARP has corrected fundamental misconceptions about the frequency and intensity of storm systems in the Southern Hemisphere. It clarified the effects of the ocean on continental weather. And it provided additional clues to the possible long-term impact of rising CO_2 levels of world climate.

NOAA and the National Science Foundation have cooperated in launching a solid, well-balanced FGGE research program. The two agencies are also collaborating in a regional GARP experiment in Europe in March and April of this year. This Alpine Experiment is studying atmospheric flow patterns in mountainous regions and the effect of high-altitude terrain upon mid-latitude cyclones (not to be confused with tornadoes). The results should permit the effects of mountains to be calculated more accurately tin developing numerical forecast models.

Opportunities for the Future

I am confident that NOAA can maintain a strong and effective program of service to the Nation as the Federal Government tightens its belt under the President's vital program of economic recovery. But maintenance of NOAA's excellent record of service will require constant attention to management efficiency and the setting of firm priorities. Accordingly, I have suggested several major management reforms.

Reorganization of NOAA

After careful assessment and consultation with the Secretary of Commerce, Administrator Byrne has decided to propose organizational changes that will allow NOAA to maintain or improve services, meet urgent budget priorities, improve internal and external communications and reduce administrative overhead. We must radically upgrade planning and monitoring of NOAA-wide activities, provide a mechanism for rapid technical decision-making, and link NOAA's research efforts more closely to concrete, visible improvement of products and services. I expect to propose important program readjustments and reforms as well.

Long-range NOAA Plan

The Nation's fiscal imperatives require of us the careful establish of priorities and we in NOAA are determined to choose decisively among competing programs. We must invest the taxpayers' money only in those research and service activities where the payoff justifies the expense. We can accommodate the rising demand for services only by higher productivity. The changes I have in mind will establish a framework for NOAA's program and management advances during the remainder of the decade. I expect that the planning process itself, including periodic updates and adjustments, will be highly beneficial—and perhaps in surprising ways. As in the case of the proposed reorganization, I look forward to consultation with members of the Committee concerning the substance and timing of this plan for the '80s.

New ways of doing business

In addition to reorganizing and planning, NOAA must also find new ways of doing business, some of which are directed by Administration guidelines. I will briefly comment on two of these mechanisms: user fees and cooperative interagency programs.

We are systematically evaluating NOAA programs to determine which ones can be financed entirely or in part by user fees in lieu of general tax revenues. Those programs whose beneficiaries are states, municipalities or identifiable segments of the public, and which primarily provide conveniences or profit-making opportunities, are the top candidates for user fees. Natually we will consider how such fees might affect program constituents and we will evaluate administrative costs, the possibility of setting up trust funds, the matter of copyright protection and the need for additional legislative authority. Federal agencies, the general public and "unidentifiable" beneficiaries will not pay fees, and those programs designed to protect life and property or to ensure Congressionally-mandated income transfer may not be obligated to do so either.

Of course, user fees are not new to NOAA. Fiscal year 1980 user fee receipts amounted to $41 million from 21 programs. However, our first round of analysis has identified nearly two dozen programs with the potential of generating perhaps $100 million in revenues by fiscal year 1985.

Finally, by taking a harder look at existing cooperative programs, we may find some multiagency functions that could be performed more efficiently by a single agency. I am exploring this subject with my counterparts elsewhere.

The Administrator and I intend to work with you and your colleagues in the House of Representatives on the foregoing to ensure that we efficiently provide all the services to the American people that are reasonable and necessary in this time of fiscal austerity. We can't do it all, but we can do a great deal.

We are convinced that NOAA's atmospheric mission is more important than ever. Forecasting the weather, providing timely warnings of life-endangering hazards, obviating property damage, conducting research on a global scale and cooperating with other nations—all these functions are essential for any society which prides itself on rational conduct of its affairs and the best use of its resources. NOAA's diverse activities generate huge benefits for society at large and will pay off even more handsomely over the next five, ten and fifteen years as we introduce new technology.

This concludes my presentation, and I will be pleased to respond to your questions.

QUESTIONS OF THE COMMITTEE AND THE ANSWERS THERETO

Question. A considerable amount of money has been spent on the first Global Atmospheric Research Project (GARP) in 1979. How does this nation intend to use the date collected in this project?

Answer. The field work for the First GARP Global Experiment (FGGE) was completed in 1979. Since then, the GARP/FGGE program in NOAA has: (a) Completed data processing, organizing, and archiving at the NOAA National Climatic Center in a form accessible and useful to atmospheric scientists.

(b) Supported research grants and contracts at NOAA research laboratories, other government facilities, and at universities and non-government research institutions. The latter has received the majority of the funds, much of it in joint grants with the National Science Foundation. This research uses the FGGE data to advance the goals to FGGE:

(1) Increase time range and accuracy of weather forecasts, primarily by improving numerical weather prediction models;

(2) Determine the characteristics of an optimum international global operational weather observation network; and

(3) Increase knowledge of the physical basis of climatic variability.

Question. What is the U.S. role in the World Climate Research Program? Can we keep our international obligations with the proposed cutbacks? Will the U.S. continue to be the leading nation in this program?

Answer. The U.S. was the first nation to formally extablish a national climate program, and we played a leading role in the initiation and development of the World Climate Program. The program was motivated by a recognition that the U.S. could not and should not tackle the job alone. The problem of climate change is global by its very nature. All nations are affected in one way or another by its adverse consequences. Practical benefits can be derived by pooling talents and resources in a unified program to improve understanding and ability to respond to climate fluctuations. We should participate in the WCP because it is in our national interest to do so.

We can continue to play a leading role in the World Climate Research Program in the area of ideas and scientific planning. We are providing leadership in the planning of several global-scale research projects, including the International Cloud Climatology Program, TOGA (Tropical Ocean-Global Atmosphere interaction), and the World Ocean Circulation Experiment (WOCE).

Question. In your testimony you complained about the unfavorable GAO report on the Automation of Field Operations and Services (AFOS) program. What were the major elements of criticism and what is your reaction?

Answer. The GAO investigation into the AFOS program came at a time when the agency already had taken steps to correct difficulties that had been encountered in implementing the new system. The coincidence of these corrective efforts and the GAO investigation led to a confused GAO interpretation of the purpose and status of AFOS. The GAO drew many conclusions about the viability of AFOS as an operational system to support field operations. They expressed particular concern about the length of time required to develop and implement the AFOS system and the relative obsolescence of that system (vintage 1975) compared to current technologies. In addition it was their opinion that AFOS did not satisfy current and projected NWS requirements.

These two major conclusions of their investigation, combined with their estimate of the added cost to complete the system at over 200 field sites, were the basis of their initial recommendation that NOAA abandon the AFOS program and proceed with the development of a new system. Later, this was tempered to a recommendation that NOAA delay national implementation of the existing system pending further testing and evaluation of the performance of AFOS, while still urging that NOAA proceed immediately with the acquisition of a replacement for AFOS.

NOAA's primary concerns were that GAO's analysis gave insufficient emphasis to the high priority need to provide continuing weather services throughout the 1980's in the face of tight personnel and budget constraints, and that the utility of AFOS in streamlining and improving current operations was seriously underestimated. The GAO recommended that NWS operate with largely WW/II technology until an entirely new system could be provided, an interval they later admitted would require at least seven years. NOAA challenged the feasibility of this approach and pointed out the costs in maintenance, refurbishment, and in service would be substantial. The National Weather Service demonstrated that AFOS would support essential weather services while at the same time leading to significant improvements in the productivity of field personnel. GAO eventually backed away from their initial position of abandonment of AFOS.

NOAA agreed from the outset that, like all computer-based systems, AFOS has a somewhat limited useful life (to the end of the 1980's) and that, by design, not all future requirements are met by the system. NOAA has had planning underway for more than a year to develop and acquire the replacement system.

Question. Has the National Weather Service taken any steps to guarantee the continuity of the Fruit Frost and Agricultural Weather Service Programs until such a time as the private sector can provide a replacement?

Answer. The Zone Forecasts from our basic services that contain expected values of maximum and minimum temperature, precipitation probability, and wind characteristics, among other things, will be available for farm management use throughout the transition period. We will make available any previously published historical records, technical reports, or collections of forecasts that could help prepare private sector firms to handle the specialized nature of these services.

Question. This Administration has emphasized its intent to maintain Federal support of basic research. Can you explain why the fiscal year 1983 budget request contains so many proposed eliminations and cutbacks in basic research programs, such as convective clouds, severe storm and upper atmospheric and space research?

Answer. NOAA's primary mission is to provide services while conducting adequate R. & D. to maintain and improve those services. In view of the Administration's desire to reduce the level of federal expenditures, we decided to reduce those areas which would have the least short-range impact on continuation of vital services. Reductions in R. & D., as well as in other areas, were made with that criterion in mind. Approximately two-thirds of the R. & D. reductions are grants. In some cases, such as in the Sea Grant Progam, these grant-supported activities may be continued by state and local governments and the private sector.

Question. You maintain in your testimony that climate research is proposed to be continued at $10 million in fiscal year 1983. Can you give us a breakdown of that figure?

Answer. The $10 million for climate research in fiscal year 1983 is a conservative estimate. It is divided approximately equally between oceanic research related to climate, and atmospheric climate research.

In ocean climate research work is planned in three principal categories:

(a) Equatorial Pacific Ocean Climate Studies (EPOCS). EPOCS is a program of field measurements, data analyses, and research to study the influence of the equatorial Pacific Ocean on climate variations. It is budgeted for over $3 million in fiscal year 1983.

(b) Subtropical Atlantic Climate Studies (STACS). STACS is a program to determine the heat transport in the Atlantic Ocean. It is budgeted for about $1 million in fiscal year 1983.

(c) Ocean climate modeling analyses, and diagnostics. Over $1 million in budgeted in that area.

In atmospheric climate research, work is planned in these areas:

(a) Continue operation of four baseline monitoring stations (Hawaii, Samoa, South Pole, and Alaska), representing global background concentrations of carbon dioxide, ozone, and other trace constituents which influence climate, and to conduct analysis and interpretation of data from these stations and other sources ($1,400K).

(b) Conduct research to develop numerical climate models aimed at predicting climate variations ($1,000K).

(c) Monitor global carbon dioxide concentrations at many stations and conduct research on the global carbon cycle ($900K).

(d) Conduct monitoring and research on ozone, stratospheric water vapor, and halocarbons ($600K).

(e) Continue solar—terrestrial and radiation measurements related to climate, continue the necessary calibration program, and conduct associated analysis and research ($1,000K).

(f) Conduct support of the International Satellite Cloud Climatology Program ($300K).

Question. NOAA's Space Environmental Services Center, part of the Space Environment Laboratory in Boulder, Colorado, is heavily involved in NASA's Shuttle Operation. What will the impact of the termination of the Upper Atmospheric and Space Research Program be on the Shuttle operation?

Answer. NOAA is committed to maintaining the real-time Space Environment Laboratory data acquisition and display system (SELDADS), which provides the unique data base for the world-wide space environment services forecasts, and warnings provided by NOAA's Space Environment Services Center. A computer-to-computer link is maintained between SEL and NASA's Mission Control for real-time data transfer. During the present infrequent NASA shuttle flights, SEL forecasters will be able to operate 24 hours per day for the period of a Shuttle flight in support of Shuttle operations. Once the Shuttle becomes operational and the flights become more frequent, the impact of 24 hour day operation on the reduced number of SEL staff over extended periods will have to be assessed. At the $2.0M level, the number of maintenance and software people for keeping SELDADS operating will be somewhat reduced. During other periods normal SEL operations will be reduced to 8 hours per day with a professional on call in case of a major solar flare.

NOAA will meet with the other Federal agencies on June 8, 1982 to examine in detail the impacts on the users and alternatives to the present mode of operation.

Question. Can you describe what use other Federal agencies make of NOAA's solar terrestrial forecasts?

Answer. The following table summarizes the uses of some of the Federal agencies of the NOAA solar terrestrial forecasts, alerts and the real-time worldwide data base:

Agency	*Use*
U.S. Air Force	Command and Control Communications. The Air Weather Service also incorporates classified data into the NOAA data base and transmits the combined data to several military headquarters.
NASA	Evaluation of space radiation environment for protection of astronauts from damaging radiation and determination of drag effects of Shuttle and satellites. Shuttle launch hold or mission termination decision may evolve from use of SESC data.
Naval Astronautics Group	Solar radiation flux and geomagnetic values used to maintain the accuracy of the Navy Navigation Satellite System.
Naval Ocean Systems Center	Navy Command and Control Communications.
Naval Space Surveillance System.	Provides time-sensitive satellite vulnerability support to U.S. Fleet and Allied Forces from SECS observed values of solar flux and geomagnetic activity.
FAA	Coordination of national and international air safety and commercial air traffic; protection of communications, radiation avoidance in high altitude aircraft flights.
U.S. Coast Guard	Command and control communications. Search and rescue operations.
U.S. Geological Survey	Geomagnetic surveys for energy resources.
Department of Energy	Energy exploration. Also SEL data and alerts go to a number of companies in the energy industry conducting geomegnetic surveys, and for protection of oil pipelines.

Agency	*Use*
In addition, some of the major civilian industrial users include:	
A.T. & T. Longlines Co	Protection of longline transmissions via coaxial cable.
American Electric Power Co	Solar alerts and forecasts permit instant restoration of electric power networks by distinguishing between solar induced outages and other internal network causes. Alerts relayed via power industry to a number of other companies.

Question. In your testimony you spent very little time on NOAA's Weather Modification Program. Can you tell us what the agency's policy is on weather modification?

Answer. NOAA has pursued an active research program on precipitation enhancement and severe storm mitigation. The ulitmate success in weather modification will depend on greater understanding of key physical processes within clouds. As a consequence, our most recent research has focused on two basic scientific needs—better understanding of the interactions between cloud microphysics and cloud dynamics and greater insight into the origin and initial growth of ice in natural clouds.

Question. In recent years many witnesses and officials have expressed the need for a National Weather Modification policy. The Administration proposes to eliminate most of the weather modification research. Is that based on anything more than merely a search for budget cuts?

Answer. NOAA's primary mission is to provide services while conducting research and development to maintain and improve those services. Because of the Administration's desire to reduce the level of Federal expenditures, budget reductions are necessary, and we have decided to reduce those areas that we feel will have the least short-range impact on the continuation of vital services.

Question. Is there still need for a national weather modification policy?

Answer. NOAA is conducting a program of fundamental research on the nature and behavior of clouds and cloud systems which should answer the key questions needed to place weather modification on a sound scientific basis. It is NOAA's view that the present level of activity in this field does not warrant additional Federal legislation at this time.

Question. What is NOAA's involvement in weather modification?

Answer. NOAA currently has five weather modification projects: (1) the Florida Area Cumulus Experiment, a project designed to determine whether dynamic seeding can augment convective precipitation over an area of South Florida; (2) the Cumulus Dynamics and Microphysics Program, a research effort to understand convective cloud processes and to provide information on precipitation enhancement experiments; (3) the Ice Crystal Process Program, a study to understand how ice forms, propagates, and grows in clouds and to determine how seeding can influence these processes (4) the Federal-State Cooperative Program, whose objective is to develop evaluation technologies for two types of precipitation enhancement (mountain snowfall and summer cumulus rainfall); and (5) the Hurricane Modification Research Program, which consists of observations, analysis, and modeling studies of the structure, dynamics, and microphysics of the hurricane system. All five projects have been proposed for elimination in fiscal year 1983.

Question. What is the present level of non-Federal weather modification activities in the United States? What are the projections for the future?

Answer. NOAA has just completed a summary of U.S. weather modification activities reported in 1981 under Public Law 92-205. The report which will be published in a few weeks also provides data on activities since 1973. In brief, the number of non-Federal activities in 1981 was 38, the lowest since the start of the reporting program. Many of these activities have continued in 1982.

Using nine years of reported information as a data base, non-Federal weather modification activities show a decreasing trend over the past 4 years. If widespread drought conditions or advances in weather modification technology occur, the number of non-Federal weather modification activities would be expected to increase.

Question. How can this Nation ever hope for an effective, efficient and fair program of rain enhancement, if you close down the research program?

Answer. Elimination of NOAA's weather modification projects in fiscal year 1983 will not mean the end of all Federal activities. The Bureau of Reclamation (BuRec) in the Department of the Interior and the National Science Foundation (NSF), have conducted research in weather modification for several years. Each has requested funds for weather modification research programs in fiscal year 1983. BuRec has approximately $4.3M in the fiscal year 1983 budget for winter snowpack augmentation research in the western United States. Fiscal year 1983 funds will support an ongoing project in the Sierra Nevada Mountains and planning for a winter program in the Colorado River Basin. NSF supports research aimed at understanding fundamental physical processes that are important to weather modification objectives. Field-oriented projects are conducted by several university investigators to test hypotheses in both intentional in inadvertent modification. The National Center for Atmospheric Research Convective Storms Division is funded by NSF to study precipitation mechanisms in cumulus cloud systems with ultimate objectives to improve forecasting and to establish a better scientific basis for modification.

Question. Dr. Hallgren, last year the Administration proposed closure of 38 stations. The Congress agreed to closure of 18 by the end of this month, and 20 more by the end of fiscal year 1982, but the Administration subsequently changed its position, and decided to keep the additional 20 open through fiscal year 1983. Are any of these stations, and specifically, the Walla Walla station in Washington State, in jeopardy for 1982?

Answer. We cannot answer at this time. The answer is dependent on impending Congressional actions.

Question. Would you please describe the services which agricultural weather and fire weather provide?

Answer. The agricultural weather services can be characterized in the three groups: observations, forecasts, and advisories. Local observations of weather elements that are especially significant in farming operations are taken at over 800 agricultural locations across the country daily. Weather Service Forecast Offices and certain Weather Service Offices issue applied forecast of these elements daily for 16 states, and from 2-to-5 days per week in another 21 states. The four Agricultural Weather Service Centers (AWSC) perform the applied agricultural weather advisory services for 16 states—services that include data collection and data-base management, liaison with state agricultural experts and farmers, operation of production-oriented weather/crop relationships computer models, daily issuance of agricultural weather advisories relating expected weather to farm operations and alternatives, and the education of farmers and state experts through seminars and short courses.

The fire weather program provides Federal and state forest and wildland management agencies with the meterological services they require to efficiently, economically, and safely carry on their operations. These services include:

Input to the National Fire Danger Rating System, and other fire danger rating systems, which estimate fire risk. It is used to set manning and readiness levels, and to plan other land management operations.

Localized forecasts, advisories, and warnings for wildfire prevention, suppression, and control operations in forests and rangelands.

Localized forecasts and advisories for prescribed burning operations. Prescribed burning is used to reduce wildfire hazard, improve rangeland and grazing lands, promote timber growth, improve wildlife habitat, facilitate timber harvest, and remove timber harvest slash.

Localized forecasts for smoke management to protect air quality during prescribed burning operations.

Forecasts and advisories for disease and insect control operations.

Forecasts and advisories for general silviculture activities, tree farm and nursery operations, grassland and forest replanting operations, activities to protect watershed areas, and to improve recreational utilization of forest lands.

Training for Federal and state wildland management agency personnel.

Question. To whom are these services provided?

Answer. Products such as the agricultural weather forecasts, advisories, and limited data summaries are disseminated to the general farming community by the mass news media and through direct broadcasts of the NOAA Weather Radio. The full range of products is available in the 16 states covered by AWSC's, and the remaining states receive a more limited set of forecasts and data summaries according to the program services in each state. The liaison and educational services are generally provided to agricultural experts in the State Extension, Land Grant University, and USDA Agricultural Experiment Station systems in the 16 AWSC states only.

The principal users of fire weather services are: U.S. Forest Service (DOA); Bureau of Land Management (DOI); National Park Service (DOI); Bureau of Indian Affairs (DOI); Fish and Wildlife (DOI); Department of Defense; The Divisions of Forestry or Departments of Natural Resources of each of the 50 States; State Departments of Parks; State Environmental Protection agencies in California, Oregon, Washington, Utah, and South Carolina for smoke management.

Private timber companies also utilize the fire weather services and products as part of cooperative agreements with Federal and state agencies.

Question. With respect to Agricultural Weather services, do you have any dollar figures on the annual crop loss savings attributable to this program?

Answer. Independent surveys have conservatively estimated the savings at between $400 million and $750 million per year.

Question. With respect to Fire Weather services, do you have any dollar figures on the annual timber loss savings attributable to this program?

Answer. Approximately $46 million of timber value is saved each year through the availability of fire weather services. These services help maintain the current level of fire protection effectiveness. Fire damages are $330 million annually under the current program; 70 percent of these damages are timber losses. If the fire weather services are discontinued, losses can be expected to increase by 20 percent annually. Lack of this service would also cause fire suppression costs to increase $40 million per year.

Question. Do you have any indication as to whether the private meterological industry is equipped to provide these services?

Answer. There are a few private firms providing some of the localized, tailored fruit frost services already. We think the private sector can provide the specialized aspects of the agricultural weather services in specific locations. It is not clear that this could be done on a national basis.

Question. How would the cost of a private sector program compare to the cost of funding the National Weather Service to conduct this program?

Answer. We have no way of knowing what the total cost of privately provided services will be.

Question. What steps, if any, has the Service taken to assure the continuity of the Fire Weather and Agricultural Weather Programs until such time as the private sector can replace them?

Answer. The Zone Forecasts from our basic services that contain expected values of maximum and minimum temperature, precipitation probability, and wind characteristics, among other things, will be available for farm and timberland management use throughout the transition period. The National Weather Service will continue to provide input to the National Fire Danger Rating System and forecasts for the suppression and control of wildfires. We will make available any previously published historical records, technical reports, or collections of forecast technique discussions that could help prepare private sector firms to handle the specialized nature of these services. However, there is still no clear indication that the service can be aggregated nationally in a private sector mode. Thus, some breaks in continuity can be anticipated.

Question. What would be the impact on the agricultural industry/timber industry if Agricultural Weather/Fire Weather programs are not replaced?

Answer. Higher consumer prices, some specific crop failures, some shortages in specific foodstuffs at the markets, a higher level of farm and agribusiness failures, and a decrease in the positive balance of trade for farm products would result if these services were not replaced. Prescribed burning would be reduced by about 50 percent due to the lack of accurate or adequate fire weather services. This would result in major long term impacts on timber production by significantly reducing reforestation and timber improvement. There would be a minimum of a 10 percent reduction in total timber output over time.

Senator SCHMITT. Thank you, Dr. Calio.

Dr. Hallgren.

Mr. HALLGREN. I have no statement.

Senator SCHMITT. You have no statement.

And, Dr. Ostenso, also has no statement?

Dr. Townsend, then.

STATEMENT OF JOHN W. TOWNSEND, JR., DIRECTOR, FAIRCHILD SPACE & ELECTRONICS CO.

Mr. TOWNSEND. Mr. Chairman, as you have requested, I will keep my opening remarks brief.

In my view, the fundamental mission of the National Weather Service is to provide weather forecasts for the protection of life and property as well as the enhancement of the economic well-being of this country. I feel this is clearly a public service mission and must be conducted by the Federal Government for compelling operational, scientific, and political reasons.

Important as the protection of life and property is, one should not lose sight of the many positive aspects of timely and accurate weather forecasting to production of food and fiber, to water resource management, to energy planning, distribution, and use, and finally, to the general economy.

To accomplish this mission, the Weather Service must engage in two distinct kinds of activities. First, they must provide the day-to-day services through collection and analysis of weather observations, and by communicating and disseminating the resultant forecasts and warnings.

The second activity is to improve these products through scientific research and the application of modern technology.

Both activities are equally important. Reducing the National Weather Service and NOAA to a pure service role will lead to stagnation and the loss of direct benefits to all aspects of our society.

Presently, atmospheric research in the national weather service and elsewhere in NOAA involves improved weather forecasting, weather modification, and climate prediction. I believe great strides forward have been made in medium-range forecasting of 1 to 7 days and that the assets and systems are already in place to make significant further improvements. However, enhancements are needed in our efforts at short-range forecasting and, at the other end of the time scale, seasonal forecasting.

Fortunately, recent research leads one to believe that our understanding of convection and other small-scale processes can be dramatically increased. This, coupled with new observational technology such as Doppler radar, satellites, and other remote-sensing devices can lead to truly accurate watches and warnings of severe weather on a local basis, with sufficient time available to the affected populace to take evasive action.

The research program on seasonal forecasting is not nearly so mature. But there is a promise that ocean—atmospheric modeling can lead to useful products. The climate research program is really just beginning, and it is too early to tell what may be accomplished.

The impact of success in this field would be so profound to our global society and economy that it must be given a high priority but watched carefully for progress.

With respect to weather modification, I must express my own disappointment that after many years of work, we still lack the fundamental knowledge to progress toward operational capability except under certain very special and limited meteorological situations. I believe because of the highly complicated nature of the subject, that the principal research efforts should be directed toward a better understanding of basic cloud physics and that applications research should take a back seat.

Mr. Chairman, you asked me to discuss the major issues that I see going forward. I would like to single out two. First, given our national pocketbook, how much weather service is enough? And second, given a constant or decreasing budget, what will the impact be on the service functions of the National Weather Service as the required new and very expensive technological systems are brought on line?

The first issue is not new. It has come up time and time again, and probably always will. I submit that this country can and should afford the very best basic weather service that science and technology can produce. Weather is a global phenomenon. To predict accurately the future state of the atmosphere, the present state must be observed and communicated from networks whose density and special extent depend on how far in the future and how well one wishes to predict. For very accurate short-range forecasts, the local network has to be very dense—or observed by remote sensing. But the area covered may need to be only that of several States in this country.

For medium-range forecasting, the network can be less dense, but must cover up to a whole hemisphere. For good forecasts beyond 5 days or so, most experts agree that global coverage is necessary but again on a reduced special grid.

The point is that science bounds the problem, not wealth or ability to pay. Given a desired accuracy and time scale of prediction, the observing networks and communications have to be equally dense in States and nations that can afford the expense as well as those who cannot.

Fortunately, satellites, data buoys, and other forms of remote sensing can make possible the necessary observations over the oceans and uninhabited areas as well as in the very undeveloped countries. Where there is a real question in this issue lies in how far the weather service should go in producing tailored products for specialized users. Private meteorologists can and do provide such services, and I believe can do much more.

But where to draw the line? I suggest that the aviation, agricultural, ocean, and fire weather services are a Federal responsibility because of the large size of the community served and because of the impact in terms of life and property of poor forecasting on the one hand and because of the benefits to be gained in an economic sense of excellent service on the other.

I would agree to some form of user charges if they could be imposed on an equitable basis, but I have yet to see this proposed in what I consider a viable fashion. A point to remember here is that after years of effort, we have a single weather service in this country. If NOAA budgets are cut, I predict that practical politics will result in the birth of competing weather services in other departments and agencies with a net loss to the taxpayer.

Beyond these basic specialized weather services, I would let private industry take over. Examples of this are fruit frost services and vessel routing.

The second issue is a more thorny one. Modern technological systems, such as satellites, AFOS, NEXRAD, and other examples are expensive, but they serve more than one purpose. They make possible things that could not otherwise be done, i.e., in this case, new and better services. And they increase our productivity. They also require a higher skill level for those employed—a good thing, in my view.

I would look at the costs of these systems as an investment in our country. The benefits of safety and economic well-being will outweigh the cost by a large factor.

In any event, a careful balance must be maintained between the budgets for the service missions in the National Weather Service and the budgets for automation and improved capability.

In conclusion, Mr. Chairman, I would like to remark that one hears much about national security lately. However, to me, national security means more than just military security. It means security against a number of threats; among these, I number economic and environmental threats—a hurricane or a large squall line is not unlike a small invading force in the damage and suffering it can cause.

I am sure that actual invasion would bring forth a response from this country that would be overwhelming. Can we afford to do much less if the disaster is the fault of Mother Nature? Thank you.

QUESTIONS OF THE COMMITTEE AND THE ANSWERS THERETO

Question. 1. Is there still need for a national weather modification policy?

Answer. I do not believe so. Weather modification is still in a research mode and until modification techniques become operational in a general way, I do not think a national policy is required.

Question. 2. In your statement, you suggested that many of the programs we discuss today are in the interest of national security. Can you elaborate some more on this subject, and specify which research programs are important in this view?

Answer. I distinguish between national security and military security. Military security is only one aspect of national security. In this vein, research on short range weather forecasting is of importance because of the threat to people and property from thunderstorms, squall lines, and tornadoes. Research on forecasting for longer time intervals, such as better monthly and seasonal forecasts, is of great economic importance; particularly in the agricultural and construction industries.

Question. 3. NOAA proposes to cut back extensively on the Upper Atmospheric and Space Research in the Space Environmental Laboratory in Boulder, Colorado. Would you please share with us your opinion on this program and the proposed cuts?

Answer. I hate to say this, because this is a field in which I have been personally involved and have a great interest, but if good programs must be cut back in these times, this program is not of the highest priority. There is, however, a valid military need in this area which is perhaps more compelling than the case for a civilian funded effort.

Senator SCHMITT. Thank you, Doctor.

And now to the final member of this panel, the final representation of the range from NASA to NOAA, Dr. Wilmot Hess. Good to have you with us.

STATEMENT OF WILMOT HESS, DIRECTOR, NATIONAL CENTER FOR ATMOSPHERIC RESEARCH

Mr. HESS. Thank you, Mr. Chairman. I am very glad to have the opportunity to talk to your committee about new technology and how it can benefit the Weather Service in the future. In the interest of time, I will highlight items from my opening statement.

First, let me turn to Doppler radar, which has been mentioned by two of the previous speakers. The NOAA National Severe Storms Laboratory in Norman, Okla., has shown that a good 10-centimeter Doppler radar will detect, with a leadtime of roughly 20 minutes, the vast majority of tornados and essentially all of those tornados that are going to cause severe damage, the big tornados. You miss a few of the small-sized ones. This detection can be done out to a distance of about 200 miles.

This is a proven technology, and the numbers are known. The reliability of the forecast is known. It opens a whole new area of safety warnings. It should be picked up and implemented as fast as it can. That technology is proven and ready to go in the field.

For a second item let me turn to short-range forecasts, forecasts on the order of 0 to 3 hours. Here one is interested in weather that is happening now and weather that is happening in the very short-term future.

You want to know, for example, are you going to face problems that will be serious for airplanes landing or taking off at a major airport? At the Denver-Stapleton Airport, Which is near the Rocky Mountains? Are you going to face severe conditions in the mountains, icing, winds that are unsafe for light planes?

In the Denver area we lose a number of light planes in the winter months in the mountains because of the poor warnings, because we do not know the conditions well enough. We have an experiment in place right now——

Senator SCHMITT. In that case, the pilot should probably not be flying up there anyway.

Mr. HESS. That is correct. But they would know better not to fly there if they had that information.

Senator SCHMITT. I wonder.

But I do not want to discourage you in your efforts.

Mr. HESS. I would suggest, anyway, that the weather information can be made available to these interested communities through a continuous automated surveillance system which would produce a nowcast—that is, produce the detailed meteorological information on a scale of the order of 50 kilometers by 50 kilometers—and to get this promptly to the people who want to use it, airline pilots, people who are worried about the weather in local affairs.

There is an experiment underway at NOAA in Boulder, Colo., called PROFS—prototype regional observing and forecasting service—which is to see how effective this kind of a system can be.

This PROFS facility collects data from conventional Weather Service radars, from Doppler radars in Boulder, from 21 automated ground stations, from 18 automated hydrological observing stations, from polar-orbiting and geostationary satellites, and from one profiler, which I will talk about in a minute.

All of this information is available in the PROFS system at one place, and if it were communicated to users, would provide more meteorological data on the area of about 50 kilometers by 50 kilometers than any comparable place in the world.

This is an experiment. It is an attempt to see how useful this kind of data collection system can be. The PROFS facility is like a forecast office. We have forecasters from the Weather Service who come there to see how effective this kind of increased weather observation can be in making their forecasts.

The people who work in that facility now say if they had a flash flood now like that which occurred in the Big Thompson Canyon 30 miles from Boulder in July 1976, they would detect it and warn against it with a leadtime of an hour or so. That flood was not warned against, and 130 people lost their lives. With a system like PROFS in place it would be possible to detect and warn people about this kind of severe weather.

Next, let me turn to the forecast period of a few hours up to a day. In this time range, you cannot use the nowcasting technique of simply detecting information on the present state of the atmosphere. You have to move forward and make short-term forecasts. The key missing ingredient in being able to do that efficiently now is lack of knowledge of the upper air. Present upper air soundings are taken roughly every 300 kilometers apart, twice a day. That is reasonably good for doing the job of predicting tomorrow's weather, but it simply is inadequate if you are looking for short-term forecasts, especially of severe weather. You have to have the stations much more closely positioned, and the records taken more continuously in time.

There is a system available to do this now called the PROFILER. This is an experimental unit developed by the research laboratories of NOAA operating in the Denver area. It combines two kinds of instrumentation. It has a special radar which will measure winds from the ground upward through the troposphere into the stratosphere with very high accuracy, on the order of a couple of miles an hour. It also has an upward looking passive microwave radiometer. This is the kind of instrument which is commonly used downward looking from satellites to measure temperature profiles of the atmosphere. Now, turn it around, use one on the ground looking upward. You can, by this technique, measure the temperatures in the lower atmosphere much more accurately than you can from the satellite looking downward.

Now consider the possibility of combining these. Have an upward looking system from the ground, and have a satellite overfly it every now and then, and combine the two sets of data. You will increase the accuracy of both data sets, and end up with a profile which is almost certainly as good as those that are available now from balloons. You can by using the continuous feature of the upward-looking instruments from the ground update the satellite information periodically, and therefore have it in a high state of calibration for positions between the locations where you would have the ground stations. This would improve the accuracy of those satellite temperatures profiles all over the United States by using a combination of a network of the order of 100 of these PROFILER systems in the United States, and satellites.

From this I think one would get the capability of measuring vertical wind and temperature profiles essentially continuously on a 30-kilometer scale of distance. That, I think, would go a very long way toward improving the accuracy of forecasts on the several hour up to 1 day timeframe.

Thank you very much, Mr. Chairman.

Senator SCHMITT. Did you have another?

Mr. HESS. There is one more item which I will cover if I have time.

Senator SCHMITT. Yes, please do.

Mr. HESS. Now move to the forecast period from 1 to 10 days. The National Weather Service now does a very credible job in making forecasts for 1 or 2 days. There is a high level of skill in those forecasts. The major job now is pushing forecasts out to 3, 5, 7, 10 days. The National Academy of Sciences recently stated that the addition of detailed information on the global wind field, information which is not available accurately enough or continuously enough now, would be the most effective single step toward achieving a breakthrough in a 3- to 10-day weather forecasting accuracy.

How can you get this global wind information? We now get wind data at local places over land from balloons. We get it from the motion of clouds, from satellite pictures where there are clouds and where one can interpret them easily as low level or high level. The accuracy there is simply not enough for the kind of forecast improvement we are talking about here. The only way that looks possible for doing this now is through the use of satellite-borne infrared Doppler lidar.

This is a system which has been under study for several years by the research laboratories of NOAA. The studies have progressed far enough so that the people involved are convinced that satellite tests should be carried out. The possibility of measuring winds to accuracy of a few meters per second from satellite with this Doppler technique looks quite achievable. If you have this downward looking laser in some kind of a conical scan mode which as you step the satellite forward gives you forward looking and backward looking views of the same location, you can get horizontal winds as well as vertical winds.

This capability of developing a multilevel picture in global coverage of the winds of the atmosphere should go a long way toward improving forecasts in this range of several days, and I would hope that would extend the useful coverage out to 10 days. Thank you.

[The statement follows:]

STATEMENT OF DR. WILMOT N. HESS, DIRECTOR, NATIONAL CENTER FOR ATMOSPHERIC RESEARCH [1]

Mr. Chairman: I am very happy to have this opportunity to testify to your committee on new technology that will benefit the National Weather Service in the future. There are several systems that have been developed enough and tested enough so that we can predict their usefulness reasonably well now.

I will not talk much about satellites because I know that others will cover this subject later. I will talk about new kinds of ground-based remote sensing gear and new kinds of numerical models to aid forecasts.

I want to divide the subject into four parts:

1. Improving tornado warnings
2. Improving nowcasts or short-time forecasts for 0 to 0.1 day
3. Improving forecasts for time interval of 0.1 day to 1 day
4. Improving forecasts for one to ten days

These different time scales correspond to different space scales and require quite different instrumentation.

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[1] The National Center for Atmospheric Research is sponsored by the National Science Foundation.

1. IMPROVING TORNADO WARNINGS

Doppler radars have been used experimentally for about ten years studying tornadoes. This radar measures the line-of-sight motion of the particles scattering the radiation back to the transmitter and in this way it measures wind speeds inside a cloud. It can detect the change of motion which is towards the observer on one side of the tornado and away from the observer on the other side. The NOAA National Severe Storms Laboratory in Norman, Oklahoma, has shown that a good 10 cm Doppler radar will detect more than 90 percent of all tornadoes out to a distance of 200 km. The few tornadoes that may be missed are very weak ones that will cause little damage. The radar detects the swirl or vortex in the overhead cloud before the tornado funnel forms. There is a lead time of about 20 minutes from the detection of the vortex by the radar until the funnel touches down. This lead time can be used to warn the people in the direction the vortex is moving. The tornado's location can be measured by the radar to an accuracy of about one mile, so a quite specific warning can be made.

This technology has been proven. It is ready to start being prepared for operational use.

2. IMPROVING FORECASTS ON THE 0 TO 0.1 DAY RANGE

In certain areas of the country, there are strong reasons for wanting to know a good deal about what the weather is now or what it will be soon. Consider the Denver urban area containing a major airport, Stapleton, the fifth busiest in the United States. A large number of airplane accidents once blamed on pilot error are now thought to be weather induced. When a plane is nearing a landing, if it encounters a sudden wind shear or a gust front from a storm or a "downburst" from a storm, it may lose lift and crash. In winter, a small plane taking off from Denver to fly into the mountains needs to know about the winds and icing conditions in the mountains within 30 miles of Denver. We lose several planes each year in the Rockies, usually due to weather.

Also, residents of Denver want to know that the weather is now for their comfort and pleasure. Should I take a coat to the Broncos game this afternoon? Will it be all right to drive my camper into the mountains or are those chinook winds going to get too strong?

Very short term (0 to three hours) local forecasts and warnings are best handled locally by means of a continuous, automated, surveillance of the atmosphere, using a combination of automated surface weather stations, Doppler weather radars, and satellites. The integration of such data sets into a system capable of providing up-to-date "nowcasts" (description of the current state of the local atmosphere), and short term local weather watches and warnings, is currently underway in NOAA in their PROFS program (Prototype Regional Observing and Forecasting Service).

A special facility and staff of meteorologists, engineers and computer specialists has been assembled in Boulder, Colorado. This facility collects data from:

(1) NWS conventional radars at Limon, Colorado, and Cheyenne, Wyoming
(2) Doppler radar at Boulder
(3) Twenty-one automatic meteorological ground stations
(4) Eighteen automated hydrological observing stations along rivers
(5) Polar orbiting and geostationary satellites
(6) The NWS AFOS data communications system
(7) One profiler (plus 3 more to be added later)
(8) A lightning network

This PROFS system collects more meteorological data in an area of about 100 km × 100 km than is done at any other place in the world. By combining data from these various sensors a forecaster could get a much more complete picture of what is going on in the Denver area than is now available in an ordinary weather forecast office. PROFS routinely displays:

(1) Satellite and radar images superimposed on terrain maps
(2) Maps of surface meteorological data and plots of convergence, vorticity and streamlines
(3) Movies of the time changes of the meteorological data

Scientists at NCAR and the University of Chicago have shown that Doppler radar data used with ground meteorological data can detect gust fronts and downbursts and thereby help air traffic.

This PROFS facility simulates a forecast office. Forecasters from NWS operational offices come to Boulder to see if the extensive data set can help a forecaster do his job better. What new instruments help most? In what meteorological conditions?

Can we use new mesoscale models to help forecast better? Do we need other new instruments? How will we disseminate this information to the people who need it?

This facility provides an essential base for creation of local-scale weather services. The data base and processing have already provided the meteorological research community with new insight on the smaller atmospheric scales of motion. Operational forecasters who have used the facility stress its usefulness as a training ground for mesoscale forecasters. The technology evaluation that is possible in PROFS will result in greatly reduced risk and cost for future system procurements.

On July 31, 1976, a severe flash flood occurred in the Big Thompson Canyon 30 miles north of Boulder. The flood killed approximately 140 people. If we had a replay of this disaster today, the PROFS system would identify the precursors and using a flash flood numerical model allow a forecaster to make a warning an hour or more in advance of the flood.

3. IMPROVING FORECASTS ON THE 0.1 TO 1.0 DAY TIME INTERVAL

Local weather forecasts on this time scale are a major problem for the forecaster. This time scale is too long to be handled effectively by extrapolating the PROFS-type nowcasts and warnings, and too short to be covered effectively by NOAA's current numerical weather prediction (NWP) system. A key missing ingredient here is knowledge of what is going on in air above the ground.

If NWP is to fill the time gap successfully, it will be necessary to acquire upper air data approximately ten times more frequently (in both space and time) than the present radiosonde network. Since this balloon network currently operates at frequencies of 1 per 300 km, 1 per 12 hours, upper air data at spacings of approximately 30 km and 1 per hour are implied. This data will be used in new mesoscale numerical computer models to better predict changes in the atmosphere.

Several new mesoscale computer models are being developed now by NCAR, NOAA and others. They should produce better forecasts of:

(1) The variation of rain or snow over complex terrain, like mountains
(2) The start of convection and the development of severe storms
(3) Flash floods

In the past, we haven't had the kinds of measurements that are needed to initialize these models. Only recently has it been useful to start developing them. It will be some time more before they are in widespread operational use.

How could these improved upper air data be obtained? Not by satellites alone (they could provide the spatial and temporal coverage, but not the necessary accuracy of wind, temperature, and humidity profiles); not by ground-based profiling systems such as NOAA's PROFILER (10^4 PROFILERS would cost far too much, and are not practicable over the oceans), but by a combination of PROFILERS and satellites.

The PROFILER is the key new technology needed here. The goal of NOAA's PROFILER program is to develop a ground-based electronic system for unmanned, continuous, all-weather profiling of winds, temperature, and humidity to lower stratospheric heights, with accuracies consistent with numerical weather prediction models.

A prototye PROFILER is now operating in the Denver area. The PROFILER is two separate instruments:

1. Wind measuring VHF radar

Using a VHF Doppler radar of about 6 m wave length with an antenna of about three acres of dipoles, and a modest power transmitter, we can measure the winds aloft for every one km vertical interval to an accuracy of approximately 2 mph. The horizontal and vertical components of the wind are obtained separately by using 3 separate fixed antennae pointing in different directions.

2. Passive microwave radiometer (6 channels)

This instrument which measures electromagnetic emissions from the atmosphere can measure temperature and humidity. By studying how much emission there is from oxygen, they can measure the temperature (which controls the emission rate). By studying the emission from water vapor, we can measure how much water there is in the air. These instruments have been used on satellites for some time to measure temperature and humidity. Now we are using them looking from the ground up to measure temperature and humidity at different altitudes.

Using the PROFILER we would see changes in the upper air that we completely miss now because we don't look often enough.

Preliminary results from this research prototype instrument are very encouraging. Continuous, essentially all-weather observing capability has been achieved. The wind profiles are believed to be significantly more accurate than those measured by radiosondes. At expected, the derived temperature and humidity profiles are smoother than those from radiosondes, but the details important to NWP are obtained. Pressure heights are measured with an accuracy comparable to, or better than, radiosondes; total precipitable water vapor measurements are more accurate than those from radiosondes, and a new parameter—total liquid water—is available for the first time.

The impact of this PROFILER program is believed to be very large. Scientists at NOAA's Meteorological Center have stated that it will revolutionize their numerical weather prediction capabilities, primarily because, for the first time, upper air data will be available continously. A first benefit is that it will enable them to provide a new service—a readily accessed, central, atmospheric data base that continously describes the current state of the atmosphere over the United States in all three spatial dimensions. The continuously available profiles will have major impact on NMC synoptic scale predictions, since it will be possible to initialize their models much more frequently than once per twelve hours, with data that have been averaged in time (and are therefore more representative of the average state of the atmosphere in the area), and that includes the rates of change of the atmosphere.

Even more important, the combination of satellite plus PROFILER data offers the opportunity to initialize mesoscale models, and hence provide short term local weather forecasts that are considerably more accurate, and more detailed, than present forecasts.

It is apparent that the PROFILER complements satellites in an almost ideal way. It provides accurate wind profiles (which are not available from satellites). It provides temperature and humidity profiles most accurately in the lower half of the atmosphere, complementing satellites, which measure the upper half of the atmosphere accurately. When constrained with tropopause height measurements, the resultant composite satellite/ground-based profiles are of good accuracy throughout the atmosphere.

Thus, the combined PROFILER/satellite system could use the temporal continuity and accuracy of the PROFILER to provide continuous calibration of geostationary satellite sounders. It would then be possible to use the observed (and highly accurate) horizontal gradients of the calibrated satellite data to interpolate between the PROFILING sites, with spatial and temporal resolutions as high as 15 km and 30 minutes if necessary.

Note that the satellite system does not provide adequate resolution of the wind field; for this reason it would be desirable to supplement a national network of, say 100 complete wind-temperature-humidity PROFILERS with an additional 300 wind-only profilers to provide (continuously in time) wind profiles at twice the present spatial frequency.

In this way, accurate upper air data at spatial and temporal resolutions suitable for initializing mesoscale numerical weather prediction models for time periods of 0.1 to 1.0 day would be provided at reasonable cost.

A significant amount of development work will be required to create the real-time combined satellite/ground-based profiling capability (including optimum spatial interpolation routines using the horizontal gradients observed by the satellites). A large R.&D. effort will certainly be required to develop the mesoscale NWP models. Communications and computational requirements would also be large, but not unreasonable for the 1990's.

4. IMPROVING FORECASTS FOR ONE TO TEN DAYS

After some 30 years of research, development, and operational experience, numerical weather prediction for spatial scales of 1000 km and time periods of 1 day is a proven capability; the accuracy of the forecasts decreases with increasing period, but is still statistically significant at five days.

This forecasting capability is, however, serious inhibited by lack of adequate global wind field data. A recent National Academy of Science study states that the addition of detailed information on the global wind field (information not currently available) would be the most effective single step toward achieving a breakthrough in 3- to 10-day weather forecasting accuracy. The present wind measuring methods—radiosondes, aircraft inertial navigation systems, cloud tracking from geosynchronous weather satellites, and computing winds using satellite temperature sounder data—fail to provide sufficient global coverage or high enough accuracy in the equatorial regions to reach the goal of improved 10-day forecasts. Of all of the methods studies by NOAA, only pulsed infrared Doppler lidar (laser used as a radar) in a polar orbiting satellite, a concept named WINDSAT, seems to provide the required wind field measurement improvement.

The numerical weather prodiction models that are now run on NOAA's computer at the Nation Meteorological Center require wind field inputs at 11 different height levels in the atmosphere. The satellite-borne pulsed infrared Doppler lidar would provide the resolution of these heights by measuring the time of flight of the laser pulse to the atmosphere and return to the satellite, much in the way radar now measures the range to aircraft or cloud targets. The wind speed is measured by noting the frequency shift in the backscattered infrared radiation. Aerosols in the atmosphere that advect with the wind are the moving scattering centers that cause this Doppler shift. The concept of measuring winds with pulsed Doppler lidars has been well proven in experiments with ground-based and aircraft-borne lidars. The present NOAA lidar uses to advantage much of the high energy laser technology developed under Department of Defense investigations during the past several years. Only a small amount of energy in each pulse is required to provide the wind measurements, energy levels that are well below the safety levels specified by the Bureau of Radiological Health of the Food and Drug Administration.

In cooperation with the U.S. Air Force Defense Meteorological Satellite Program and with the National Aeronautics and Space Administration, NOAA has conducted an extensive feasibility analysis of WINDSAT. The preliminary feasibility analysis was conducted by NOAA's Environmental Research Laboratories in Boulder and the hardware feasibility study was performed by Lockheed Missiles and Space Company under contract to NOAA. The results of these analyses indicate that there are no inherent technological limitations to constructing a WINDSAT, although much research and engineering remains to be accomplished. A more complete measurement of the global aerosol backscattering characteristics needs to be conducted to define more closely the size, weight, and power that a WINDSAT will require. Space qualification of the infrared lidar components and improving the lifetime of the lasers to be used in WINDSAT must also be accomplished. These tasks can be completed within several years.

In summary, the new instruments and system: 1. Doppler radar; 2. PROFS; 3. PROFILER; and 4. WINDSAT form major new technological developments that should improve the National Weather Service's ability to forecast the weather on several different time and space scales.

I hope the Congress will continue to support the research and development which will bring this new technology to a condition where it can be used operationally. I am convinced of its sizable practical value.

THE PROFS PROGRAM

I. The problem and potential solution

Records from the Climatological Data National Summary show reported annual weather-related losses that reach $21 billion, over 600 deaths, and more than 3,000 injuries. Most of these losses are caused by small-scale or localized weather such as the high winds, hail, heavy rain, lightning, and flash floods that are associated with short-lived, severe convective storm. Studies have shown [1] that a large percentage of these losses are preventable if site-specific and accurate weather information can be generated and provided to the user in a timely manner. This represents a new frontier in meteorological services. We now have the technology and knowledge necessary to make a major impact in the area of local-scale meteorology.

To conquer this frontier, we must understand that several small-scale weather events are short-lived and extremely complex. The service system must, therefore, support rapid analysis of complex information to produce timely decisions. We have a backlog of new technologies that are directly applicable to this problem. For example: radar that can detect severe strom motions that are known precursors of tornadoes; satellite and ground-based system that automatically provide continuous quantitative measures of the small-scale wind temperature and humidity fields, essential information in a rapidly changing environment; new methods of telecommunications that allow transmission of site-specific information to just those people who are in immediate danger; and inexpensive computer technology that can provide a real extension to man's innate mental power by rapidly organizing and displaying the complex information necessary for critical, small-scale weather decisions. By organizing and integrating these technologies into an effective service-oriented local-scale weather system, we can begin to reduce national weather-related losses. It is a beginning because this action is directed toward the creation of only the technological base that is needed to address the mesoscale. Once created, the service impact will be immediate, and we will have a powerful new tool for seeing just how the atmosphere behaves on the smaller scales of motion. This will, in turn, lead to the creation of more advanced forecasting techniques and further refinement of local-scale services.

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[1] PROFS Staff, 1979: Report of a study to estimate economic and convenience benefits of improved local weather forecasts. Boulder, CO, NOAA, Environmental Research Laboratories, NOAA Technical Memorandum ERL PROFS-1, 18 pp.

Weather information flows along a one-way path that originates with an observation of the state of the atmosphere, proceeds to a decision-maker who predicts events in the future, and finally arrives at a user who can apply the information for his benefit. This flow is diagrammed in Figure 1.

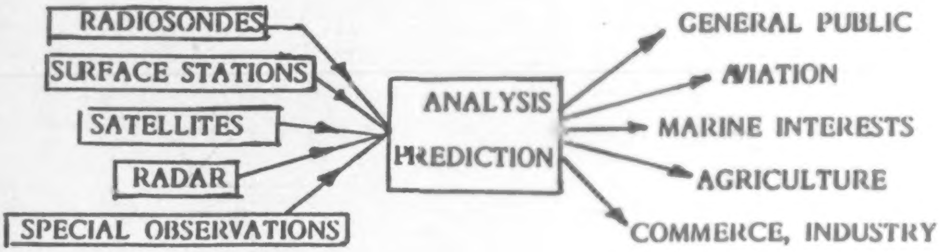

Fig. 1. The Flow of Weather Information

As we approach the frontier of local-scale weather services, we must pay careful attention to the information flow model. To be effective, new capability must be added to existing services at each stage of the flow. These capabilities are the advanced technologies that are not yet part of the national weather services. The keys to local-scale services are more detailed information on the atmosphere (added complexity), the need for rapid decisions (speed), and dissemination of site-specific information (accuracy).

II. The PROFS program

NOAA recognized the importance of solving the local-scale service problem several years ago. Internal research on Doppler radar, higher resolution satellite information, and major field experiments like SESAME are only a few examples of research efforts directed toward severe convective storms. They also recognized that new technologies had to be carefully evaluated and integrated into service system designs before their full operations potential could be realized.

This reasoning led to creation in 1980 of PROFS Program Office as part of NOAA's Research and Development component.[2] The mission of this group is to seek and evaluate new technologies that can be integrated into functioning forecast systems to meet future weather service requirements. This technology transfer program has unique management, staffing, and facilities. Spcific major objectives are set by an upper-level NOAA management group made up of the Directors of NWS, ERL, and NESS. The Program contains line managers from both ERL and NWS, insuring a proper balance at the working level between operational requirements and the impact of new technologies. The Program, located in Boulder, Colorado, also maintains a direct link with research activity in the National Center for Atmoshperic Research. Interaction with other government agencies with direct interest in weather service system design is achieved through interagency agreements and/or direct liaison with FAA, DoD, and NASA.

Activity within the Program resembles the steps in putting together a jigsaw puzzle. Figure 2 shows the three main stages of technology transfer as practiced by PROFS. First, we see new technologies emerging from the research community. Each must be evaluated to determine if it is relevant and if it is near a stage of development that will allow introduction into operations. The potential cost savings for future systems, even at this first step, are significant. Unsuitable and unproven technologies are eliminated or sent back to the research community, greatly reducing the potential risk associated with large procurement later.

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[2] Beran, D. W., and C. G. Little, 1978: PROFS: A strategy to improve local weather services, Preprint, Conf. on Weather Forecasting and Analysis and Aviation Meterology, Silver Spring, MD; AMS, pp. 228–233.

Beran, D. W., and C. G. Little, 1979: PROFS, Prototype Regional Observing and Forecasting Service from concept to implementation, National Weather Digest, 4, No. 3, pp. 2–5.

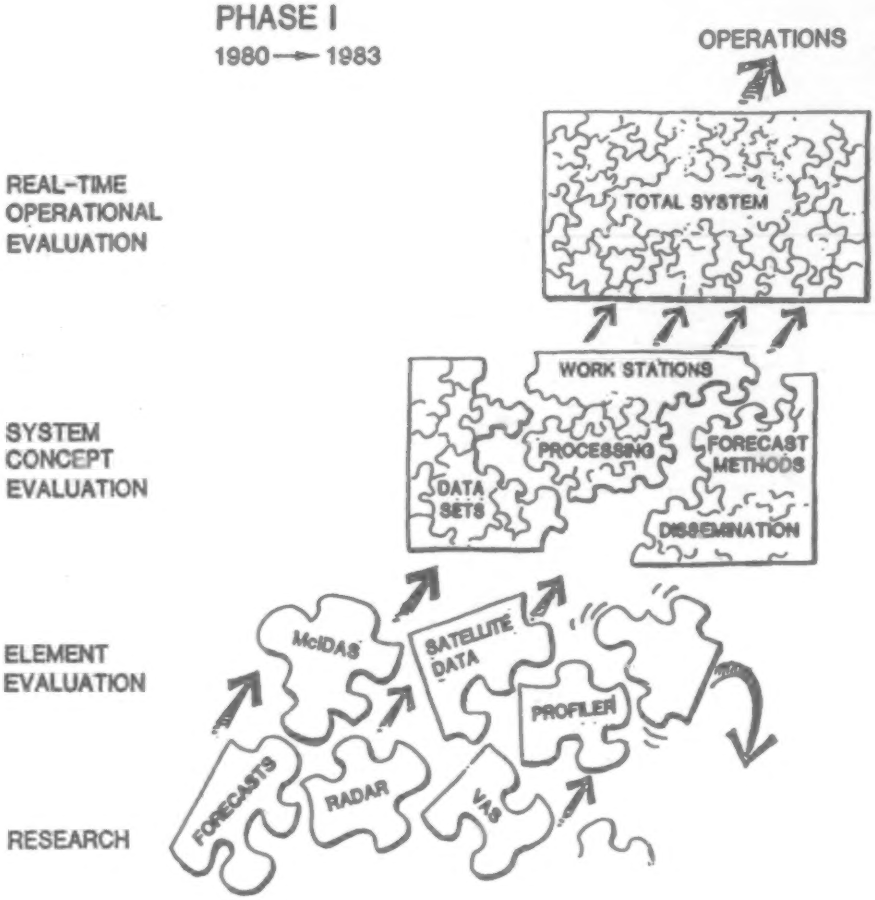
PHASE I
1980 → 1983
OPERATIONS
REAL-TIME
OPERATIONAL
EVALUATION
TOTAL SYSTEM
WORK STATIONS
SYSTEM
CONCEPT
EVALUATION
PROCESSING
FORECAST
METHODS
DATA
SETS
DISSEMINATION
ELEMENT
EVALUATION
McIDAS
SATELLITE
DATA
PROFILER
RESEARCH
FORECASTS
RADAR
VAS

Figure 2. The Technology Transfer Process

The second stage begins the important activity of developing and evaluating systems that will most effectively integrate these technologies. The most promising systems are functionally produced and tested in a controlled laboratory situation where the actual forecaster environment can be simulated. At this stage, specific weather service requirements are examined in detail and they become the driving motivation behind the system configurations that are evaluated. The potential risk of a major system procurement mistake is further reduced during this stage.

In the third stage, a fully functional system that meets specific operational requirements and is based on previous evaluations is created and placed in a real operational setting. This final system is demonstrated to the user organization and, if it is acceptable, a set of functional specifications is produced to procure the final system.

The importance of quantifiable results during each stage of the technology transfer process is paramount. Such results are very difficult to achieve for meteorological systems because the atmosphere presents a continually changing laboratory, and the most significant events are rare, uncontrollable, and random. The PROFS Program has solved this difficulty through evaluation methodologies that have heretofore found only limited, or no, use in meterological system design.[3] The method involves the collection of data sets from a large number of weather events.

The meteorological system concept to be tested is then created in complete functional form and the data sets are "played back" to the system. Operational forecasters then use the system to make forecasts. The accuracy, timeliness, and site-specificity of the forecasts form the basis for a direct measurement of the level of improvement that results from the new concept. Because the data being used are taken from actual events, the simulation is very real. The cases can be played back any number of times to any number of forecasters, thus eliminating the undesirable characteristics of the atmosphere as a laboratory (rarity of events, uncontrollable, and random), and creating statistically significant results. The entire operation is similar to the use of aircraft simulators to assess critical design questions.

In order to achieve this test capability, a special facility and staff has been assembled in Boulder, Colorado. The staff is interdisciplinary with meteorologists, system engineers, and computer specialists drawn from both the meteorological research and operational communities. The facility is directly tied to advanced sensor system, provides a true mesoscale meteorological laboratory, has the capability to simulate a forecast office environment, and has direct links with nearby operational facilities. Figure 3 shows the major PROFS facility components.

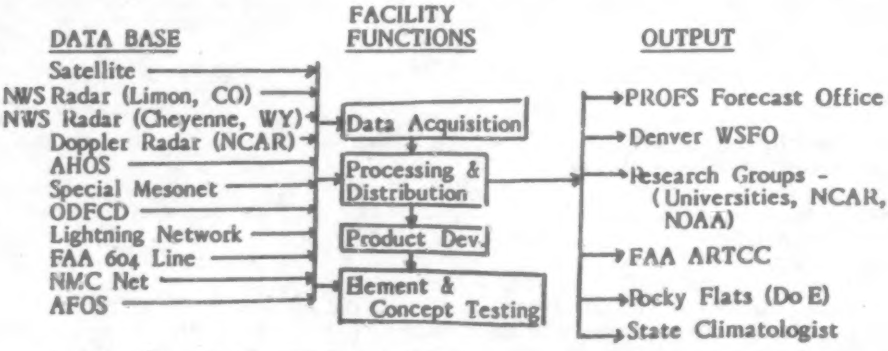
DATA BASE
Satellite
NWS Radar (Limon, CO)
NWS Radar (Cheyenne, WY)
Doppler Radar (NCAR)
AHOS
Special Mesonet
ODFCD
Lightning Network
FAA 604 Line
NMC Net
AFOS
FACILITY FUNCTIONS
Data Acquisition
Processing & Distribution
Product Dev.
Element & Concept Testing
OUTPUT
PROFS Forecast Office
Denver WSFO
Research Groups - (Universities, NCAR, NOAA)
FAA ARTCC
Rocky Flats (Do E)
State Climatologist

Figure 3. Major PROFS Facility Components

This facility provides an essential base for creation of local-scale weather services. The data base and processing have already provided the meteorological research community with new insight on the smaller atmospheric scales of motion. Operational forecasters who have used the facility stress its usefulness as a training ground for mesoscale forecasters. The technology evaluation that is possible in PROFS will result in greatly reduced risk and cost for future system procurements.

III. Ongoing PROFS projects

A brief description of the projects now underway in PROFS provides some insight on the importance of this Program to NOAA and other agencies.

Advanced forecaster workstation.—This is a major core project in PROFS. The objective, set by the NOAA upper-level management group, is to design, evaluate, and demonstrate an advanced forecasting system that will begin to solve the critical local-scale, severe storm warning problem. In the first phase, the design work addresses the need to rapidly assimilate, interactively process, and display existing data sets in a manner compatible with existing forecaster systems such as AFOS. This first design also anticipates the introduction of advanced data sets from Doppler radar, the VAS satellite, and ground-based atmospheric profiling systems.

The project, now in its third year, has developed and evaluated conceptual designs and is now preparing for the first stage of operational demonstrations.[4] Functional specifications will be provided in fiscal year 1983 for a core system that can accept advanced sensor data as well as sophisticated processing and prediction methods when they become available. The system architecture will insure that these advanced technologies can be interfaced with minimum impact on the core operational system.

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[3] Beran, D. W., and A. E. MacDonald, 1981: Design of a short-range forcasting system, Proceedings, IAMAP Symposium, Hamburg, Germany, pp. 347–350.

[4] Reynolds, D. W., 1982: Prototype workstation for mesoscale forecasting: A look to the 1990's, Proceedings, Ninth Conference on Weather Forecasting and Analysis, Seattle, WA, submitted paper.

This project will provide the primary design and specifications input for the procurement of the National Weather Service's System II, which will be the final step in a true local-scale weather service. The System Development Office (SDO) of NWS is already working closely with PROFS to insure a smooth handoff of the functional specification in fiscal year 1983. NWS will continue to use PROFS capabilities for evaluation of contractor prototypes.

Later phases of this project will concentrate on the evaluation, integration, and demonstration of interface modules for Doppler radar, VAS, ground-based profilers, and specialized dissemination techniques that will actively alert people who are in danger from severe storms. Advanced mesoscale forecasting methods, now under development by the research community, will also be evaluated and integrated with core system in the future.

ARTCC display.—The FAA's Air Route Traffic Control Centers (ARTCCs) include a staff of operational NWS meteorologists who provide operational weather support to air traffic operation. Studies have shown that very large savings can be realized if short-range, mesoscale weather information can be made available to these centers. For example, the information would make it possible to anticipate approach and departure path blockages due to severe weather and wind shear, and runway changes due to wind shifts, both as much as 30 minutes in advance. With this amount of lead time, the controller can adjust traffic patterns and avoid the major delays that often occur when unanticipated weather events occur. The fuel savings and increased margin of safety that would result from these improvements are very large.

An FAA-sponsored project is now underway to evaluate the benefit of providing mesoscale information in the ARTCCs. The data sets, display methodologies, design, and evaluation are provided by PROFS.

AWADS.—The Automated Warning Data Management System (AWADS) project has the objective of reducing the critical storm warning time by improving information dissemination. When a storm warning is issued by the NWS, it is disseminated to a large number of local emergency service groups (police, sheriffs, hospitals, etc.) via telephone or radio. At present, the forecaster uses a previously generated list of telephone numbers to get out his warning. The AWADS project has shown that with the use of a simple computer and optimization of the alerting network, some 10 to 20 minutes can be cut from the critical time required to get a warning to those in danger.

This system is ready for its first operational demonstration in the Denver, Colorado, area during the 1982 severe storm season. The NWS is monitoring the demonstration and will make a decision on national implementation based on the test results in fiscal year 1983.

MERIT program.—The Minimum Energy Routes Using Interactive Techniques (MERIT) Program is another PROFS activity that will provide direct benefit to aviation. Studies by NASA, FAA, and the airlines indicate that errors and lack of resolution in forecast wind fields can result in large losses to air carriers due to excess fuel burn.[5] By applying mesoscale analysis and interactive techniques, the studies have shown that significant improvements can be made in the wind information used to route air traffic.

This NASA-sponsored project is making use of PROFS' data base and expertise in interactive processing and display techniques to develop a functioning demonstration model of a system that will allow the airlines to achieve fuel savings estimated to be millions of dollars. This project started in fiscal year 1982 and will produce its first demonstration design before fiscal year 1984.

Department of energy support.—The Department of Energy (DoE) operates the nuclear facility at Rocky Flats in Colorado. In the event of a nuclear accident, it is important that the airborne trajectory of hazardous material be predicted rapidly and accurately. The PROFS mesoscale data network contains precisely the information needed to initialize the trajectory models that are used for making these predictions. PROFS is providing this mesoscale data base to the Rocky Flats facility.

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[5] Winer, D. E., and Wesler, J. E., 1981: Meteorological impact on fuel efficiency; FAA A/1/81, FAA Conference on Meteorological Imputs to Aviation Systems, Tullahua, TN.

Steinbert, R., 1981: Airline flight planning—The weather connection, NASA 4/2/81, Symposium on Commercial Aviation Energy Conservation Strategies, Washington, D.C.

Sankey, D. A., 1981: Meteorology at Continental Airlines, Continental Airlines, 5/5/81, International Conference on Aviation Weather Systems, Montreal, QUE, Canada.

USAF mesoscale forecasting project.—The United States Air Force (USAF) has developed special visibility sensors. Eleven of these sensors have been provided by the Air Force Geophysical Laboratory for installation in the PROFS mesonetwork. A visibility forecasting development project which uses these sensors is now underway and will be completed in fiscal year 1983.

IV. Conslusions

The PROFS Program provides a new dimension for the nation's future weather services. The strong emphasis on technology evaluation, integrated system design, and quantitative testing of conceptual systems prior to the initiation of major procurements will result in more effective services systems and greatly reduce the risk of costly mistakes. The direct programmatic involvement of managers from NOAA's research and operational components also helps to insure that the resulting designs are relevant to real operational needs and that the transfer of new technology will occur more smoothly.

The mesoscale data base and PROFS facilities are major new capabilities that form a base from which advanced mesoscale research can proceed. This capability helps fill a major gap (lack of mesoscale data and processing) that has limited our ability to conduct research on new mesoscale forecasting methods.

The interest shown by other agencies in the PROFS Program is one indicator of the need for a focused meteorological technology transfer activity. This concept is also strongly endorsed by the National Academy of Sciences Select Committee on the National Weather Services.[6] This group points up the need for a continuing program to evaluate new concepts and pilot programs so that future weather and hydrological systems can evolve from proven building blocks.

THE NOAA PROFILER PROGRAM

Introduction

Weather forecasting starts with an ability to observe the present state of the atmosphere. The more complete the observational data set, the better the forecasts can be. The atmosphere is a three-dimensional fluid, containing weather phenomena of many sizes and durations; the observations must therefore be made in all three spatial dimensions, at spatial and temporal frequencies appropriate to the phenomena to be forecast.

The major observational problem currently facing the National Weather Service (NWS) is that much of the significant weather (thunderstorms, fronts, etc.) that they wish to forecast more accurately is not adequately observed. Specifically, the current NWS upper air network uses radiosonde balloons to obtain profiles of winds, temperature, and humidity once every twelve hours at locations spaced roughly every 350 km across the U.S.A. This three-dimensional data set is well matched to the numerical prediction of large synoptic-scale weather patterns having dimensions of roughly 2000 km, and lasting several days; it is totally inadequate for the monitoring and forecasting of weather phenomena such as thunderstorms, which typically have dimensions of less than 50 km, and usually last only an hour or two.

The current problem therefore is that the upper air data are much too widely distributed in both space and time for accurate forecasting of local weather conditions. Additional limitations include the fact that the measurements of winds and humidity are less accurate than desired, that the twice daily radiosondes cannot provide the real-time ground truth essential for accurate satellite soundings of the atmosphere, and that the fixed observing times (set internationally at 00 and 12 GMT), are satisfactory for Europe, but are badly out of phase with the needs of U.S.A. forecasters. In addition, the radiosonde network requires appreciable manpower, and is therefore quite expensive (approximately $200,000 per year, per station).

Goal of NOAA's PROFILER program

The goal of NOAA's PROFILER program is to provide an upper air measuring capability that overcomes the above difficulties. The new system should provide, automatically, and under essentially all weather conditions, continuous profiles of wind, temperature, and humidity, with accuracies comparable to (or better than) the radiosonde. The data shoud be available continuously as ground truth for geostationary and polar-orbiting atmosphereic sounders, and total lifetime costs (including manpower) should, if possible, be less than for the current radiosonde stations.

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[6] Getting, I. A. (Chairman), 1981: Technological and scientific opportunities for improved weather and meteorological services in the coming decade, The National Research Council, Select Committee on the National Weather Service, National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, D.C. 20418

Status of the program

Based on earlier research by NOAA's Wave Propagation Laboratory, the PROFILER program was initiated in fiscal year 1980 under the leadership of Dr. David C. Hogg. A research prototype has been built and is being tested in the Denver area. Preliminary results indicate that the above goals are being met. Continuous, essentially all-weather observing capability has been achieved. The wind profiles are believed to be significantly more accurate than those meassured by radiosondes. As expected, the derived temperature and humidity profiles are smoother than those from radiosondes, but the details important to numerical weather prediction are obtained. Pressure heights are measured with an accuracy comparable to, or better than, radiosondes; total precipitable water vapor measurements are more accurate than those from radiosondes, and a new parameter—total liquid water—is available for the first time.

Description of the PROFILER system

The basic components of the prototype system are illustrated in Fig. 1. The function and nature of each building block are discussed in turn below.

1. Wind profiling system

Two versions of clear air radar are being evaluated for use in the PROFILER. The first is based on the early work of Woodman and Guillen (1974), who showed that the large 50 MHz ionospheric Thomson scatter radar at Jimara, Peru, could be used to obtain echoes and measure winds at upper tropospheric and lower stratospheric heights. This work has been followed up vigorously at other locations by NOAA's Aeronomy Laboratory (see Balsley, 1981 for a review of this rapidly developing field).

The PROFILER currently uses a 50 MHz radar at Platteville, Colorado, developed originally by the Aeronomy Laboratory as a prototype module for the large Poker Flat, Alaska, MST (mesosphere, stratosphere, troposphere) radar. The radar (see Fig. 2) has operated almost continuously since October 1980. Recently a third, fixed, zenith-pointing antenna (not shown in fig. 2) has been added to monitor tropopause height and vertical velocities. Current parameters of the radar are shown in Table I; it is planned in the next year or so to improve the minimum height and height resolution to 0.5 km, and to increase the radiated power by a factor of about 10.

A comparison of the Platteville measurements of winds with those obtained approximately simultaneously by the Denver radiosonde is given in Fig. 3. Note that the figure includes the full range (not the rms deviation) of the seven values of wind speed and direction obtained at each height interval during the 28 minutes covering the radiosonde flight. In general, the agreement is good, especially after recognizing that some of the difference is to be attributed to the separation in measurement locations (approximately 60 km at launch, and 100 km at launch, and 100 km at altitude).

The second radar being investigated for routine wind profiling is a UHF (915 MHz) radar, now under test at the Stapleton Airport in Denver. (See Table I for main characteristics of this radar.) It is designed to provide considerably lower minimum height (100 m), and better height resolution (90 m) than the 50 MHz VHF radar. It will primarily be used to monitor wind profiles in the atmospheric boundary layer and troposphere; it is not expected to provide data significantly above the tropopause. Unlike the three dipole arrays of the Platteville radar, it makes use of a single fixed off-set parabolic surface (aperture diameter approximately 10 m); this paraboloid is fed by three horn antennas displaced from the focus to obtain three beams, respectively in the zenith, and displaced 15 degrees from the zenith in the north and east directions. It is expected that this radar, which uses solid state components throughout, will be in routine operation by the end of 1982. Its location will permit easy comparison with radiosonde wind profiles obtained by the National Weather Service twice per day at the same site.

2. Temperature and humidity profiling

The second major subsystem of the PROFILER is a six channel microwave radiometer, specifically developed to provide continuous information on temperature and humidity profiles. Four channels in the oxygen absorption band at 5-6 mm wavelengths are used to derive temperature profiles. Corrections to these channels for the effect of any atmospheric water vapor or liquid water are provided by channels at 20.6 GHz and 31.6 GHz. These channels (one on the water vapor line near 22 GHz, and the other in the transmission window between water vapor and oxygen absorptions) serve also to provide information permitting derivation of the water vapor profile, and the vertically-integrated liquid water. The radiometer is modeled after the dual-channel radiometer described by Guiraud, Howard, and Hogg (1979).

The radiometer is housed in an air conditioned room. The six channels are divided into three pairs of frequencies; each pair is coupled to its own offset parabolic reflector using an orthomode coupler. The six channels have equal antenna beamwidths and receive energy from the zenith via a common low-loss window in the wall of the building and a single flat reflector inclined at 45 degrees immediately outside the window.

In order to calibrate the radiometer, and correct for receiver gain drifts, each channel samples the noise power sequentially from the antenna, a temperature-controlled reference source (at 45 degrees C), and a calibration source maintained at 145 degreees C. Synchronous detection is used to provide a channel output that is proportional to the difference in noise power between the antenna and the reference source. A second synchronous detector, comparing the noise power from the reference source with that from the calibration source, is used to correct the antenna brightness temperature measurements for variations in system gain.

The water vapor and window channels are used to identify the amount of water vapor and liquid water in the beam utilizing adaptive retrieval coefficients (Westwater and Guiraud, 1980) to extend the range of liquid water over which accurate estimates can be made. (The retrieval coefficients are adaptive, in the sense that they are themselves functions of the amounts of water vapor and liquid water present.) The derived water vapor and liquid water contents are then used to correct the four oxygen channel brightnesses. These corrected brightness temperatures, plus surface pressure, temperature, and humidity, are used in a statistical algorithm to derive the temperature and humidity profiles. This statistical algorithm is specific to each month of the year and is based on analysis of a multiyear sequence of Denver radiosonde data.

3. Surface sensors

Standard *in situ* sensors of temperature, pressure, and humidity are used to measure the surface values of these parameters, for use in the retrieval of the temperature and humidity profiles from the radiometric data. The values are averaged for 20 minutes, and stored digitally in the master computer.

4. Data processing and master computer

The VHF and UHF radars operate alternately in both horizontal and vertical wind-measuring modes, as indicated in Table I. An FFT algorithm is used to determine the echo spectra, and hence the mean Doppler shift and radial component of velocity, for each range gate on each antenna. The local radar processor then derives the horizontal wind components, u and v, for each height range, for each 130 second interval, and stores these data, together with the vertical profile of vertical wind. In addition, the intensity of the zenithal echo from each range gate is monitored, and used to derive the height of the tropopause (Gage and Greene, 1979). Twenty minute averages of tropopause height, and of wind components for each 1.5 km height interval, are made available by land-line (upon call) to the master computer at the radiometer site.

The master computer also receives the 6-channel radiometric brightness temperatures and retrieves and archives the temperature and humidity profiles as discussed in Section 2. Additional derived parameters (such as 500 mb pressure height, and profiles of relative humidity or Richardson number) are also potentially available from the computer, in the form of time series, time averages, and time derivatives.

5. Performance of the temperature and humidity radiometer

Examples of the performance of the PROFILER radiometer system are given in Figs. 4, 5 and 6. Figure 4 shows a 4 day time series of continuously-derived radiometric 700, 500, and 300 mb heights; the dots and vertical error bars denote the seven radiosonde measurements during the period. It will be seen that the 700 mb heights are in excellent agreement; the 500 mb heights agree to within the 10 m rounding used in reporting the radiosonde heights. At 300 mb, the discrepancies are about 25 m rms; there is some evidence that this number will be reduced by incorporating simultaneous radar measurements of tropopause height in the retrieval process. Figure 5 shows good agreement between the radiometric and radiosonde time series of the height of the 0°C and −10°C levels. Figure 6 shows time series of zenithally integrated water vapor and integrated liquid water for the same 4 day period, which included periods of cloud and rain.

6. Limitations of the PROFILER system

Preliminary experience with the prototype PROFILER suggests that the desired performance is being achieved. The wind, temperature, and humidity profiles are available essentially continuously to tropopause heights with accuracies and height resolutions consistent with the needs of synoptic scale numerical weather prediction models. The system operates under essentially all weather conditions, though heavy convective rains are expected to degrade the profiles. Equipment reliability has been high, despite the unattended mode of operation. Nevertheless, it should be understood that the temperature profiles, and especially the humidity profiles, have considerably poorer height resolution than the radiosonde, and therefore may not be adequate for some atmospheric research and service purposes.

Potential impact of the PROFILER program

The advent of a radically new geophysical measurement capability typically opens up opportunities for improvements in both research and services. The NOAA PROFILER, with its ability continuously to measure wind, temperature, and water vapor profiles (plus integrated liquid water) represents such a system.

The operational impact of this PROFILER program is believed to be very large. Scientists at NOAA's National Meteorological Center have stated that it will revolutionize their numerical weather prediction capabilities, primarily because, for the first time, upper air data will be available continuously. A first benefit is that it will enable them to provide a new service—a readily accessed, central, atmospheric data base that continuously describes the current state of the atmosphere over the United States in all three spatial dimensions. Major impact on NMC synoptic scale predictions will result from the ability to initialize their models much more frequently than once per twelve hours, with data that have been averaged in time (and are therefore more representative of the average state of the atmosphere in that area), and that include the rates of change of the relevant atmospheric parameters.

Even more important, the combination of satellite plus PROFILER data offers the opportunity to initialize mesoscale models, and hence provide short term local weather forecasts that are considerably more accurate, and more detailed, than present forecasts.

It is apparent that the PROFILER complements satellites in an almost ideal way. It provides accurate wind profiles (which are not available from satellites). It provides temperature and humidity profiles most accurately in the lower half of the atmosphere, complementing satellite sounders, which measure the upper half of the atmosphere most accurately. When constrained with tropopause height measurements, the resultant composite satellite/ground-based profiles are of good accuracy throughout the atmosphere.

Thus, the combined PROFILER/satellite system would use the temporal continuity and accuracy of the PROFILER to provide continuous calibration of geostationary satellite ssounders. It would then be possible to use the observed (and highly accurate) horizontal gradients of the calibrated satellite data to interpolate between the PROFILING sites, with spatial and temporal resolutions as high as 15 km and 30 minutes if necessary.

It is important to note that geostationary sounders using IR channels do not provide temperature or humidity profiles in or below clouds. Alternative methods would therefore have to be used in cloudy regions to interpolate between ground-based PROFILER stations. Several techniques exist to guide such interpolations. These include the data from networks of surface sensors; the use of vertical time cross-sections from the fixed, continuous PROFILERS to interpolate in space; the use of values predicted by the mesoscale NWP models, and the use of the continuously available wind profiles to estimate the temperature field.

Note also that the satellite system does not provide adequate resolution of the wind field; for this reason it would be desirable to supplement a national network of say 100 complete wind-temperature-humidity PROFILERS with an additional 300 wind-only profilers to provide (continuously in time) wind profiles at twice the present radiosonde spatial frequency.

In this way, accurate upper air data at spatial and temporal resolutions suitable for initializing mesoscale numerical weather prediction models for time periods of 0.1 to 1.0 day would be provided at reasonable cost. Of course, a significant amount of development work will be required to create the real-time combined satellite/ground-based profiling capability (including optimum spatial interpolation routines using the horizontal gradients observed by the satellites). A large R&D effort will certainly be required to develop the mesoscale NWP models. Communication and computational requirements would also be large, but not unreasonable for the 1990's.

The unique capabilities of the PROFILER unit will also have important impact on atmospheric research. Its continuous, vertical profiling capability will make it possible to extend studies of the temporal and spatial spectra of atmoshpheric processes one- to two-decades beyond the one cycle per day, one cycle per 700 km of the existing operational radiosonde network in the United States. This part of the meteorological spectrum includes a wide range of what might be called "significant weather" on the mesoscale (e.g., fronts, thunderstorms, flash floods, chinook winds, land-sea breezes, etc.) whose study and modeling has been handicapped by lack of suitable three-dimensional data. Each of these phenomena require research with small arrays of continuous profilers. For example, the monitoring of moisture convergence, or of the passage of gravity waves, or of a weather front, would be much better achieved by the continuous profiler, than by intermittent radiosondes.

In general, each different atmospheric phenomenon will require PROFILER data sets optimized (especially as to location and spacing) for that specific purpose. Since all meteorological phenomena do not occur in a given geographical area, or on a given scale, it will be desirable that at least some of the research PROFILERS be transportable.

Future plans

NOAA's plans for the future of the PROFILER program are designed to achieve the above impact by the early 1990's. Five principal activities have been identified:

1. Continue testing and development of this profiling capability, using the research PROFILER In Denver. Many opportunities exist to refine the ground-based temperature and humidity profiles, by integrating them with data from satellite sounders, and from the PROFILER radar. These methods are largely untried, and need to be developed and tested.
2. Evaluate the impact of a mesoscale array of PROFILERS on local weather forecasting. Work is already underway to create a mesoscale array of PROFILERS in Colorado. This network will permit testing the concept (described above) whereby mesoscale models could be initialized using the temporal and spatial continuity of data obtained from a geostationary atmospheric sounder and an array of PROFILERS.
3. Evaluate the impact of a synoptic-scale array of PROFILERS on weather forecasting. This task, proposed for initiation in FY 1985, would study the impact on medium range forecasts of a prototype synoptic scale array of some 20 continuous PROFILERS, complementing the current array of U.S. radiosonde stations.
4. Develop and test a well-engineered prototype of an operational PROFILER, to be built by U.S. industry for multi-station use by the National Weather Service. Emphasis would be on increasing the reliability, and reducing the cost, relative to the existing, in-house developed, research prototype.
5. Develop, test and use transportable PROFILERS in a series of mesoscale research studies affecting different areas e.g., land/sea breezes, orographic precipitation, chinook winds, etc.

TABLE I

Radar parameter	VHF radar	UHF radar
Frequency	49.92 MHz(λ_0= 6.0054 m)	915 MHz(λ_0= 33 cms).
Pulse width	16 microseconds	Variable, 0.6 μs to 4.8 μs.
Pulse period	2400 microseconds	Variable, 20 μs to 500 μs.
Antenna size	100 m × 100 m (3 arrays)	10 m × 10 m (3 feeds).
Bean positions	Zenith; 15′ off zenith to north; 15° off zenith to east.	Zenith; 15′ off zenith to north; 15° off zenith to east.
Peak power	12 kw (each beam)	6 kw.
Average power	80 w (each beam)	1500 W maximum.
Minimum receiving range	2.4 km AGL	~100 m.
Receiver range spacing	1,500 m	Variable, >100 m.
Number of range locations	13 (2.4–20.4 km AGL)	32
Mode 1: (for horizontal winds):		
Maximum horizontal wind speed	75.46 m/s	~70 m/s.
Horizontal wind resolution	±0.29 m/s	< ±0.25 m/s.
Dwell time	130 secs	Variable, 10–90 secs.
Mode 2: (for verticaL winds):		
Maximum vertical wind speed	± 2.44 m/s	~ ± 10 m/s.
Vertical wind resolution	± 0.01 m/s	~ ± 0.04 m/s.
Dwell time	90 seconds	Variable, 10–90 seconds.

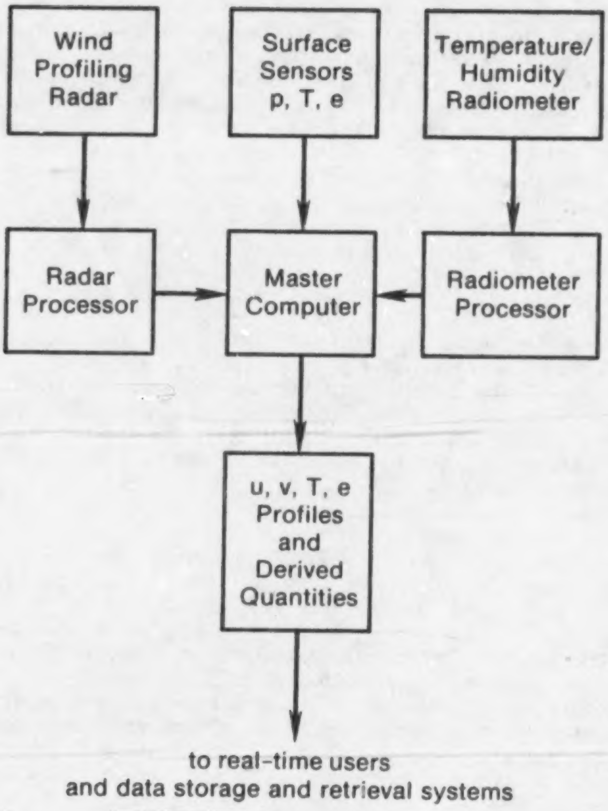
Wind Profiling Radar
Surface Sensors p, T, e
Temperature/ Humidity Radiometer
Radar Processor
Master Computer
Radiometer Processor
u, v, T, e Profiles and Derived Quantities
to real-time users and data storage and retrieval systems

Figure 1.--Diagram illustrating the major components of the NOAA PROFILER.

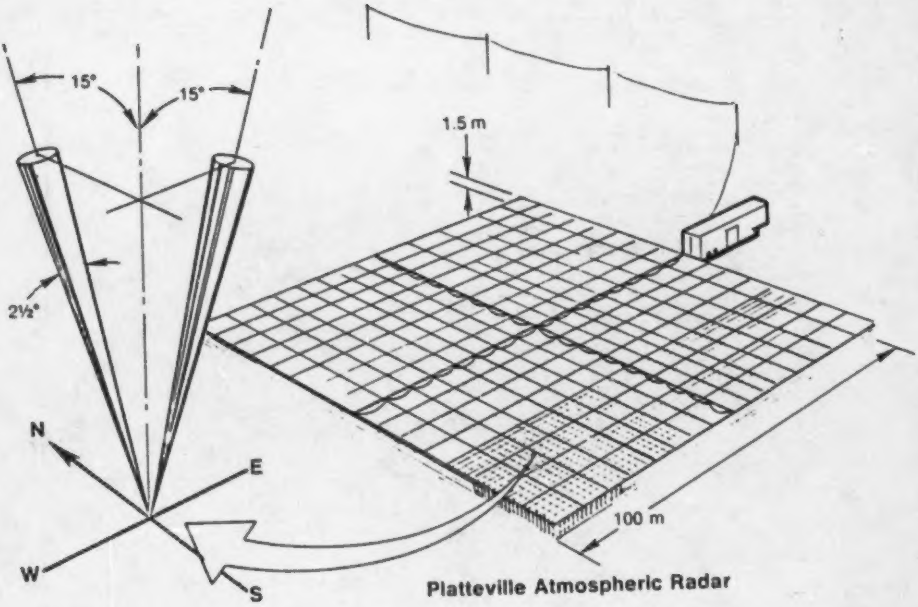
15°
15°
1.5 m
2½°
N
E
W
S
100 m
Platteville Atmospheric Radar

Figure 2.--Sketch indicating the design of the Platteville VHF wind-profiling radar.

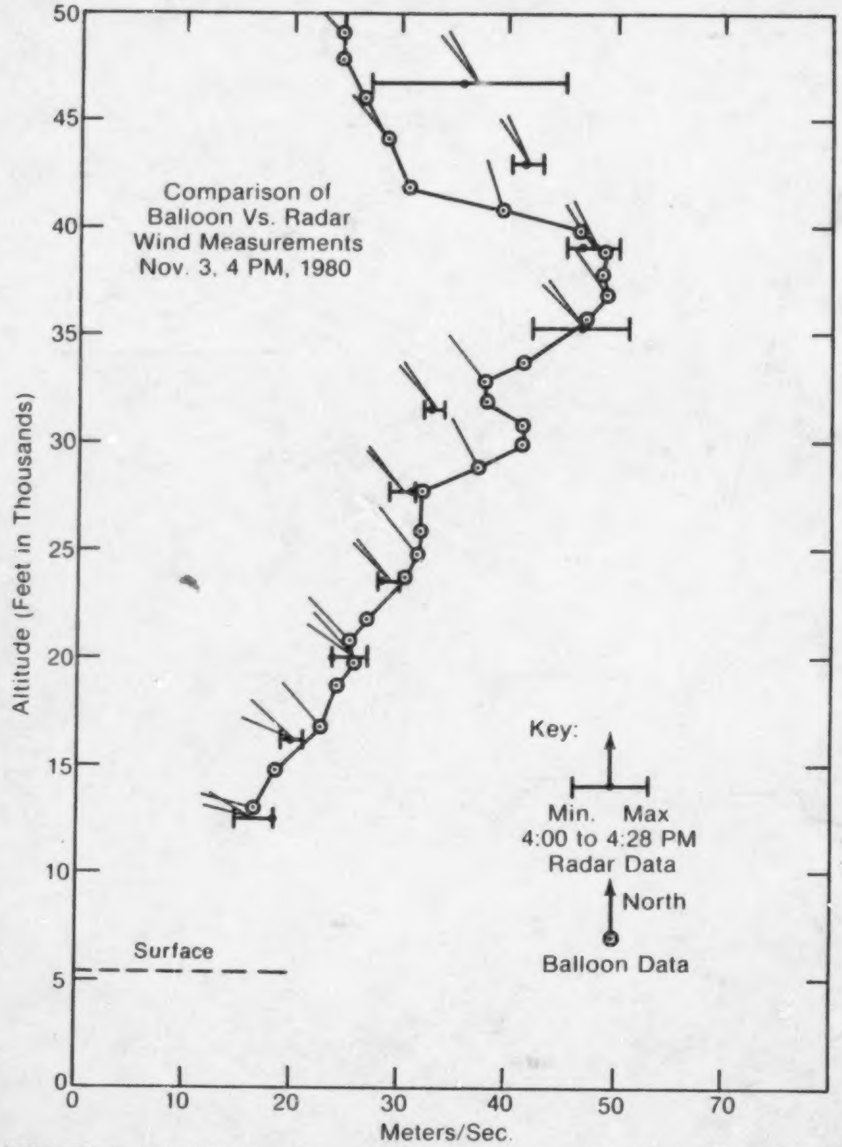

Figure 3.--Comparison of radiosonde and VHF wind profiles obtained simultaneously some 80 km apart.

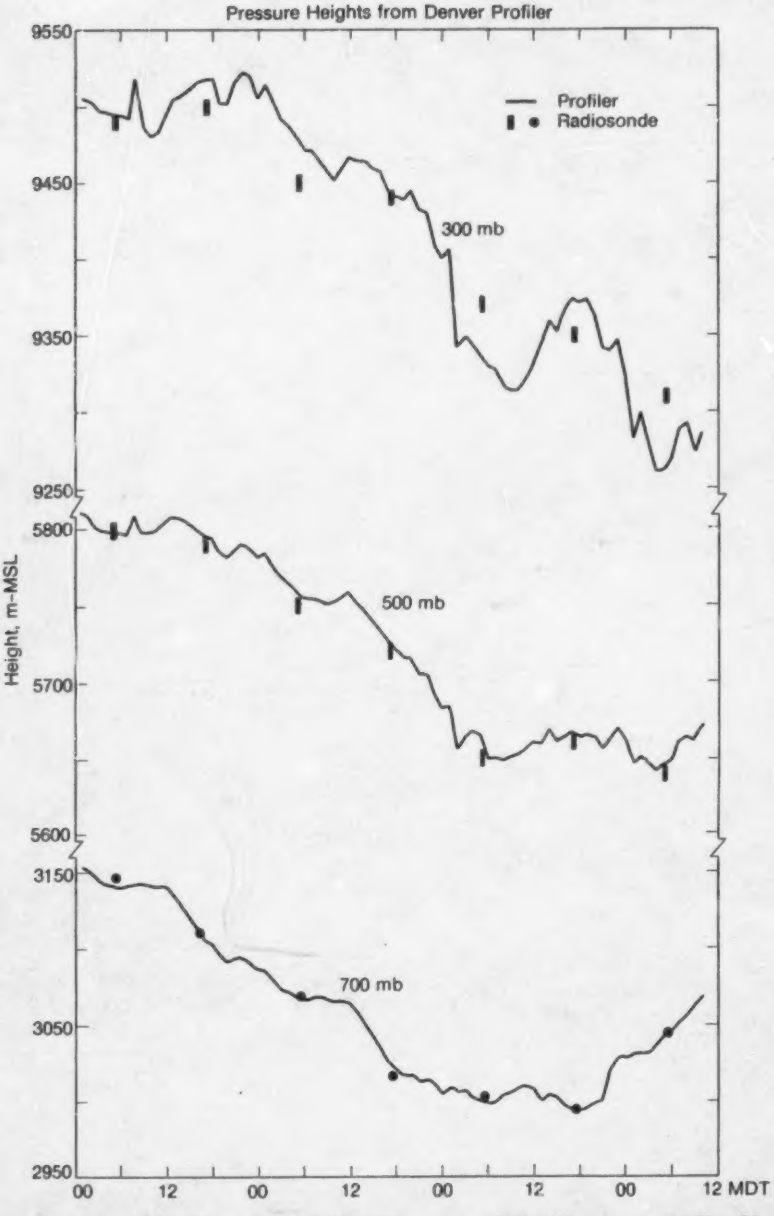

Figure 4.--Time series of 700, 500, and 300 mb pressure heights, as recorded continuously by the PROFILER system, and twice daily by radiosondes.

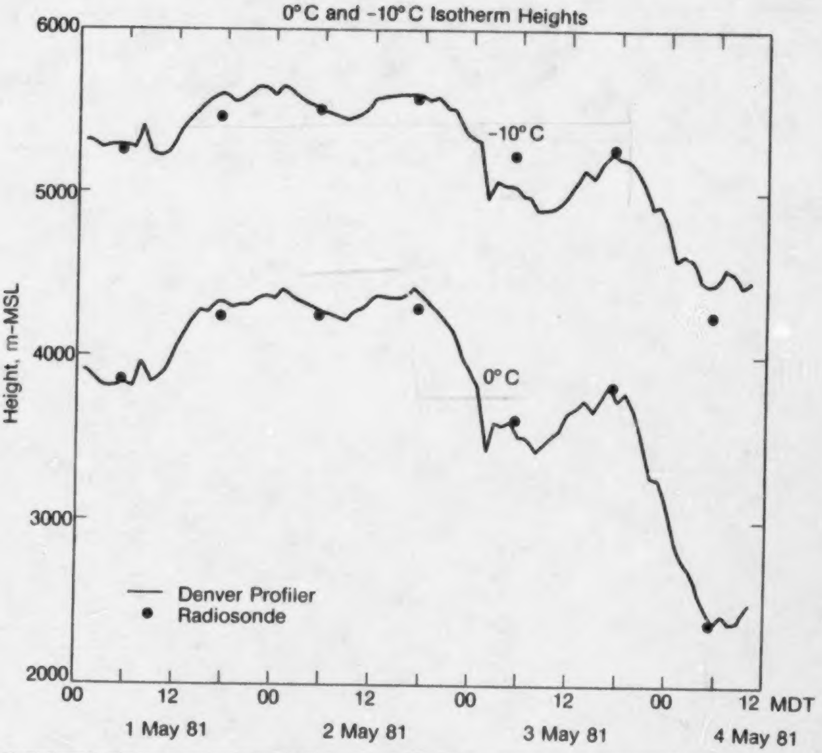

Figure 5.--Time series of the heights of 0°C and -10°C temperature levels, as recorded continuously by the PROFILER system, and twice daily by radiosondes.

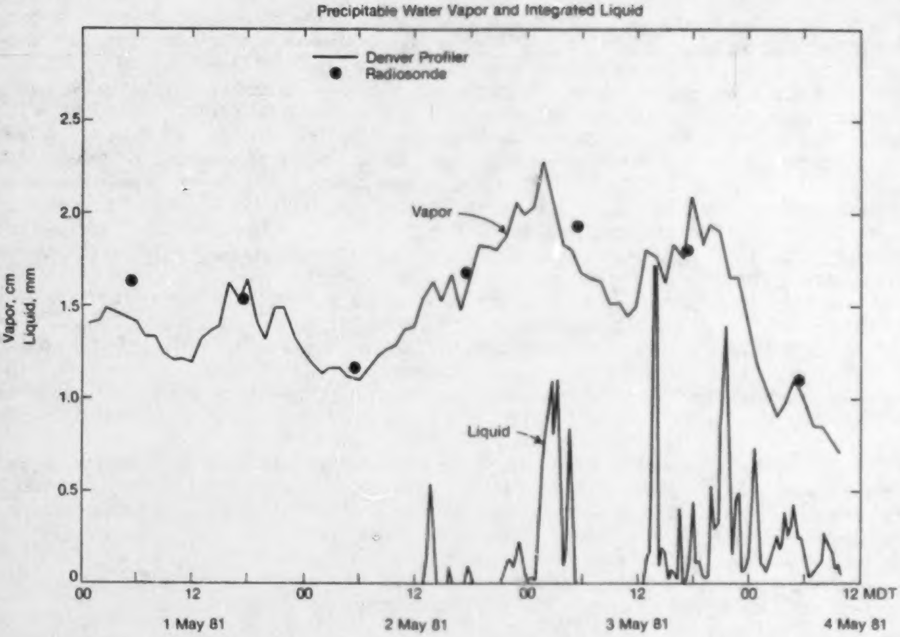

Figure 6.--Time series of integrated water vapor and liquid, as recorded continuously by the PROFILER system. The twice-daily radiosonde measurements of total precipitable water vapor are also shown.

THE NOAA PROGRAM TO STUDY WINDSAT

Introduction

After some 30 years of research, development, and operational experience, numerical weather prediction for spatial scales of 1,000 km and time periods of one day is a proven capability. The accuracy of the forecasts decreases with increasing time, but it is still statistically significant at 5 days.

This forecasting capability is, however, seriously inhibited by lack of adequate global wind field data. NOAA believes that the addition of detailed information on the global wind field (information not currently available) would be the most effective single step toward achieving a breakthrough in 1 to 10 day weather forecasting accuracy. The present wind measuring methods—rawinsondes, aircraft intertial navigation systems, cloud tracking from geosynchronous weather satellites, and computing winds using satellite temperature sounder data—fail to provide sufficient global coverage or high enough accuracy in the equatorial regions to reach the goal of improved 10 days forecasts. Of all of the methods studied by NOAA's Wave Propagation Laboratory, only pulsed infrared Doppler lidar in a polar orbiting satellite, a concept named WINDSAT, seems to provide the required wind field measurement improvement.

The WINDSAT concept

The numerical weather prediction models that are now run on NOAA's computers at the National Meteorological Center, require wind field inputs at 11 different high levels in the atomosphere. The satellite-borne pulsed infrared Doppler lidar would measure the winds at these required heights by measuring the time of flight of the laser pulse to the atmosphere and return to the satellite in the same way that radar now measures the range to aircraft or cloud targets. The wind speed is measured by noting the frequency shift in the backscattered infrared radiation. Aerosols in the atmosphere that advect with the wind are the moving scattering centers that cause this Doppler shift. Such a lidar measures the velocity only along the line-of-sight to the scattering center so that it is necessary for the lidar to probe the volume of the atmosphere under investigation from two different directions in order to obtain the two measurements required to resolve north-south and east-west winds. One method that might be used is to scan the lidar conically below the polar orbiting satellite as the satellite passes over the atmospheric volume for which the averaged wind speeds are desired. By pulsing the lidar at a uniform repetition rate, a number of different look angles into the atmospheric volume is provided so that it is possible to average independent measures of the wind—a much more representative technique than the single wind measurement at each given height in the same volume that might be provided by a rawinsonde.

Because the lidar gathers wind information at an exceedingly high data rate and the rate at which meteorological data transmission to the earth from the satellite is limited, it will be necessary to process much of the lidar data on board the spacecraft to reduce the required transmission bandwidth. Many methods of accomplishing these computations are available in digital mini-computers. This technology is well advanced and has been demonstrated using ground-based, research Doppler lidars.

The concept of measuring winds using this technique has been well proven in experiments with both ground-based and aircraft-borne lidars over the past 10 years. The present NOAA lidar uses to advantage much of the high energy laser technology developed under Department of Defense investigations during the past several year. Only a small amount of energy in each pulse is required to provide the wind measurement, energy levels that are well below the safety levels specified by the Bureau of Radiological Health of the Food and Drug Administration.

WINDSAT system analyses

In cooperation with the U.S. Air Force Defense Meteorological Satellite Program and with the National Aeronautics and Space Administration, NOAA has conducted extensive feasibility analyses of WINDSAT. The exploratory study was conducted within the Environmental Research Laboratories in Boulder starting in 1976. A preliminary set of specifications describing a WINDSAT was chosen. These specifications were believed to be typical of the size, power, and weight that would be available on meteorological satellites in the late 1980's. A carbon dioxide, transverse excited, atmospheric pressure (TEA) laser was chosen as the infrared source providing 10 Joules of energy per pulse at 10 pulses per second, with a 1 meter diameter optical telescope directing this radiation toward the earth. Using these so-called baseline parameters, the performance of such a lidar was calculated based on the best available knowledge of the atmospheric aerosol distribution, the presence or absence of clouds, and assuming reasonable angular pointing accuracies and laser stability. It was found that with a conical scan pattern below a satellite in an 800 km height polar orbit, the entire earth could be covered twice in each day with wind sensing accuracies of about 1 meter per second through most of the troposphere, the weather producing or convective region of the atmosphere, over most of the globe and in most height ranges. A number of assumptions needed to be made in this preliminary study such as aerosol availability in temperate winter and polar regions and on the extrapolated space-qualified hardware performance abilities to be expected late in the 1980's.

Based on the positive results of this preliminary analysis, a hardware feasibility study contract was awarded to Lockheed Missiles and Space Company in 1979 through a NOAA contract. This much more extensive feasibility analysis confirmed the earlier results and provided many details on the design configuration that could be employed in a WINDSAT feasibility demonstration experiment to be transported by the Space Shuttle. The Lockheed study showed that there are no inherent technological limitations to constructing a WINDSAT, although much research and engineering remains to be accomplished. Such a space lidar can take advantage of many satellite hardware developments that are already under way or have already been proven on previous spacecraft. The study did point out the need for a more complete measurement of the global aerosol backscattering characteristic so that the size, weight, and power of a WINDSAT could be more closely defined. Space qualification of the infrared lidar components also needs to be demonstrated and the necessity for improving the lifetime of lasers to be used in operational WINDSAT, where 3 to 5 years of reliable operation will be required, must also be accomplished. It was concluded that the aerosol measurements and the hardware development tasks could be completed within several years, making the design of a Space Shuttle-borne WINDSAT feasibility model possible in the latter half of the 1980's.

Current status

NOAA is presently working with NASA and the Air Force to determine a proposed national WINDSAT policy. Both the civilian and the defense sectors' user need requirements need to be more completely defined. The responsibilities of the different federal agencies also need to be worked out and operational procedures and data dissemination policies developed. In addition to the improved weather forecasts that numerical weather prediction simulation experiments have already indicated will be possible with WINDSAT, there will be other users for the WINDSAT data sets for answering real-time, operational requirements in the Department of Defense and in the private sector as well. There will undoubtedly be international interest in obtaining the satellite-measured wind data sets.

Because WINDSAT will be the most complex meteorological satellite ever launched, including temperature sounders and cloud imagers as well as the Doppler lidar, the cost for the satellite will be proportionately larger than for previous weather satellites. Methods for distributing the costs to the benefiting users should therefore be investigated.

A multi-agency conference is planned within the next few months to begin working on details for the further development of the WINDSAT concept. NOAA will be pleased to keep the Congress informed of the progress made in WINDSAT and, especially, on the results of further numerical weather prediction experiments using simulated WINDSAT data sets. When this work is completed, the atmospheric sciences community will be able to compute the cost-benefit ratio expected for an operational WINDSAT. Detailed long-range plans for WINDSAT implementation will then be possible.

QUESTIONS OF THE COMMITTEE AND THE ANSWERS THERETO

Question 1. Is there still need for a national weather modification policy?

Response. No. Weather modification has taken such a backwards slide in the last few years that there is little to make a policy about. Apparently NOAA will terminate its programs in weather modification next year. This will leave only the Department of Interior actively carrying out weather modification work.

The most important thing to do now in weather modification is to get a strong program of basic research started to try to determine in what situations weather modification may work.

Question 2. Can you tell us what postponement of the implementation of the NEXRAD system will mean, specifically for the tornado warning service and development of the Prototype Regional Observing and Forecasting Service (PROFS) System?

Response. Postponing NEXRAD will mean more people will die from tornadoes than need be. About 100–200 people die each year from tornadoes now. The tornado warning service of the National Weather Service now relies on volunteer spotters to observe tornadoes on the ground. They also look for "hook echoes" on conventional radars as indicators of tornadoes. Both of these techniques are very imperfect. Only another small percent of tornadoes are now preceded by NW warnings.

Doppler radar can detect 100% of all large tornadoes. These are the ones that kill people. Dopplers provide about 20 minutes to warn people before the tornado touches ground. If a prompt warning can be made by the NWS using Doppler radars this should mean that 50–100 people each year could be be saved, whose lives would otherwise be lost to tornadoes.

Delaying NEXRAD will not affect PROFS. There are now experimental Doppler radars, including one at NCAR, that are being used by PROFS.

Question 3. How operative is NOAA's PROFILER in your opinion? When do you think it can be in full use?

Response. The PROFILER is a research system now. It should be use for several years before making the decision about its operational usefuless. If it works as well as expected during its test period, I would think NOAA could consider starting to bring it into operational use in 3 or 4 years. It could eventually replace all balloon radiosonde systems.

Question 4. How are NOAA's plans for PROFILER? Where does it show up in the budget?

Response. The PROFILER is combined in the NOAA budget with PROFS. This budget item is due to end in fiscal year 1983. This would mean that both PROFS and PROFILER would stop before they have had a chance to be demonstrated to work well enough to be used operationally.

In my opinon this would be a serious mistake. We must continue PROFS and PROFILER until they are proven systems. The budget item for both PROFS and PROFILER should be extended for 5 more years.

Question 5. Does the operation of PROFILER depend on the existence of the polar orbiting satellites or the geostationary satellites?

Response. No. The ground-based instruments which make up the PROFILER are a stand-alone system. They can operate by themselves.

However, the PROFILER is made more accurate and its capabilities extended by combining its operation with a polar orbiting satellite carrying a temperature sounder. The satellite temperature profiles are more accurate in the upper atmosphere. The ground-based PROFILER temperature profiles are more accurate in the lower atmosphere. When a satellite overflys a PROFILER and the data from the two are combined, they both can be made more accurate.

Question 6. NOAA proposes to cut back extensively on the Upper Atmospheric and Space Research in the Space Environmental Laboratory in Boulder, Colorado. Would you please share with us your opinion on this program and the proposed cuts?

Response. The Work of the Space Environment Lab of NOAA is of two kinds. First, they carry out a service function through the Space Environment Services Center. This forecast operation is jointly manned and operated by NOAA and the Air Force. It provided all of the radiation in space data to NASA during Apollo. It is essential to certain classified Air Force missions. It serves 14,000 customers from power companies to scientists getting ready to fire rockets.

The Service Center forecasts solar flares, geomagnetic storms and ionospheric disturbances and provides real-time data on radiation and fields in near-earth space. It is unique. I consider it an essential and very well run operation.

The second part of the work of SEL is research. They carry out a very substantial satellite-borne program of measurements on the radiation belt and aurora. They are working to increase our understanding of the near-earth environment. It is very important that SEL has a research arm in order to help upgrade the service operations.

I feel strongly that the work of SEL should be continued. I feel this is an essential part of the operations of NOAA. If in the face of very hard budget conditions, it is essential to cut back, then the research work would have to be reduced some but the Service Center and a certain amount of developmental research must be kept going.

Senator SCHMITT. That laser system is based on the particle content, on the presence of particles in the atmosphere?

Mr. HESS. Yes, the laser beam goes down in the atmosphere and is scattered back to the satellite. The scattering occurs on aerosol particles in the atmosphere. We know enough about the density of those particles to know that we will get enough scattered light back from a 10-joule laser system on a satellite to get continuous records.

Senator SCHMITT. Well, Dr. Calio, our old buddy Bill Hess says that the technology is here or is practically here to develop a whole new generation of or network of forecasting facilities around the country. How does NOAA feel about that? Are we about ready once the budget is under control in this area, to move forward in this area?

Dr. CALIO. I think you put it just right. You know I would never disagree with my colleague, Dr. Hess.

Senator SCHMITT. I know that.

Dr. CALIO. You know that.

Senator SCHMITT. Let us see. I will go back and look at my notes.

Dr. CALIO. I certainly agree with Dr. Hess and Dr. Townsend's assessment, and I think the technology is here. We should be able to incorporate it into weather service capability once the experiments are successfully demonstrated, and they are in the process of doing that. As indicated, Doppler radar exists today, ready to be used, and it is a matter of money. It is a question of trying to trade off the higher priority activities for those of lower priority. That is the management task ahead of us.

Senator SCHMITT. Since the private sector is going to be one of the major beneficiaries of this, has it been considered that there might be some fee method by which it could be financed and put into operation?

Dr. CALIO. We are considering user-fee concepts. That is not a new activity with respect to NOAA. In fiscal year 1980 I think NOAA collected something on the order of $40 million in user-fees from 21 different programs. That is one of the management activities we have underway right now. We are looking at ways in which NOAA can provide basic raw material to the private sector and allow them to then produce tailored products for a specific use, for a specific industry.

Senator SCHMITT. And collect a royalty off of it?

Dr. CALIO. That is right. Collect user-fees which would reimburse us for the costs of the acquisition of the original raw data. As far as a cooperative effort with industry on the implementation of these technologies goes, we have not explored that idea.

Senator SCHMITT. Well, we will leave that to another time, but I think when one sees, as Bill has pointed out so well, the potential for some of these new technologies, and the fact that they are now proved through the experimental stage and through the prototype stage, in fact, we ought to be considering as many innovative ways as we can to implement them, and there are some interesting potential ways in which the initial capital might be provided and then reimbursed, depending on the interest of industry itself to provide that initial capital so long as they know they are going to recoup their investment.

Dr. CALIO. There is a crying need for Doppler radar. There is no question about that at all. We really should try to install that as quickly as possible. As far as the PROFILER and laser activities, we are supporting that research. I do believe the WINDSAT concept, the lidar, is a little far away for implementation over the next few years. I think we are 6 or 7 or 10 years away from that.

Mr. HESS. It will be several years before it has its satellite tests. We want to wait until successful conclusion of those tests before deciding anything about operational use. The PROFILER and the PROFS system are closer but still not ready.

Dr. CALIO. Yes. Dr. Hess has described the spectrum there. NEXRAD, the Doppler radar, can be incorporated right now. We know how to do it, how to use it, and that has been demonstrated. The PROFS and the PROFILER have been demonstrated experimentally. It would take probably 3 to 5 years to incorporate them into an operational system. The WINDSAT lidar capability is probably the farthest down in the way of technological capabilities to be successfully demonstrated.

We are supporting the experimental work associated with the lidar and the PROFILER and the PROFS.

Senator SCHMITT. Is not the shuttle a good test bed in the fairly short term to demonstrate the feasibility of lidar?

Dr. CALIO. Yes. As a matter of fact, it is an ideal test bed for demonstrating that.

Mr. **Hess**. A lidar flight of the WINDSAT concept is being seriously considered. I think it is about 7 years from now.

Dr. **Calio**. Yes; just about that timeframe. There is still some basic work, though, that has to be done. I think that is correct.

Senator **Schmitt**. One more technical question, Dr. Hess. In 10 years flying back and forth across the United States at high altitude in a T-38, and just thinking qualitatively about the kind of reports and observations that I could make, I had the distinct impression that the most severe tornado activity was at times associated with very high velocity jet streams intersecting with lines of thunderstorm instability. Is that coincidence that I would have noted that, or do you know of any strong evidence that that in fact is true?

Mr. **Hess**. I would defer to my colleague, Mr. Hallgren.

Mr. **Hallgren**. Yes; that is true. In that type of a situation, there is a greater frequency of tornadoes. In part that jetstream is a reflection that down near the surface of the Earth there is warm air and cold air colliding. It is in those zones where you have a greater chance of tornadoes, so your observation is correct, but would not cover all the situations.

Senator **Schmitt**. I understand that, but has it been demonstrated that there is a correlation in the nature of the intense shear that develops when you have a high velocity jetstream interacting with a relatively slow-moving line of instability? I would call the nearest forecast office and ask them, do you have any severe tornadoes, whenever I made that observation of those two intersections. They would almost invariably say yes.

Mr. **Hallgren**. Yes. One of the rules of thumb is that if you have that type of a situation, you bring it under much closer observation, primarily through radar, we see that type of situation develop in the satellite photos where you have a jetstream aloft, and you have this slower moving but still intense boundary zone between the cold and warm air, so it is a rule of thumb. The exact correlations in the normal way are not always there, but it is used by the severe storm forecasters.

Senator **Schmitt**. The thing was that very often the intensity of the jetstream had not been forecasted, and I would be picking it up, because monitoring my groundspeed I would know that I had 100 or 120 knots on the tail or on the headwind, which is more unfortunate, and so the correlation seemed to be qualitatively fairly exact.

OK, gentlemen. With respect to a NOAA omnibus authorization, could the panel give me their opinion on the general idea of an omnibus act for NOAA and the advantages or disadvantages that you might see? Who would like to start?

Dr. **Calio**. Let me go ahead and start, and I am sure my colleagues will add to that. When I look to the left of me and see the heritage that we bring to this table, my comment has to be that an omnibus bill would certainly be positive. It would be an advantage if all the responsibility for NOAA were put under one overall bill. There is a wealth of experience which shows the value of such an act for NASA. It has been a useful tool that has survived the years. And certainly, I think it would be very useful for NOAA in the same way.

The main advantage is to be able to bring together in one place the views from the various congressional subcommittees to make sure that we understand the congressional point of view. If that hurdle can be jumped, then I think that a NOAA omnibus bill would be a very useful tool to have.

Senator Schmitt. Serving on the Appropriation Committee as well as the authorizing committees, I can tell you, you will always have plenty of views. The question is, does it help overall in focusing those views to have an omnibus authorization instead of dealing with the issues one by one in various fora.

Dr. Calio. My general idea, based on the studies we are conducting, is yes. But, we are still trying to evaluate that within NOAA.

Senator Schmitt. Dr. Townsend?

Mr. Townsend. Yes. I would like to comment. As you may remember, I had Tony's job for about 10 years, and spent a lot of time thinking about this, in fact, trying to sell the idea. I felt that ESSA and then NOAA suffered from the lack of an omnibus authorization. I think the trick is to single out those programs that should be subject to annual review, and I think there probably are some, and then those that should probably be authorized for 3 or more years. I do not think you would want to put all of NOAA under an annual authorization. I think that would be unwieldy for the committees because of the broad scope of things that NOAA covers. But I think an omnibus authorization would be a help. It would give NOAA an opportunity to set forth its programs, and its successes in a more focused way. Hearings in the past have covered highlights such as we have covered today, but there are a lot of things I can think of that NOAA has done very well in in the last year or so that usually do not come to light in general hearings. If you are looking at a specific program, you can then get a feel for the problems and progress.

During my regime or whatever, OMB did not fight the concept. They said, you are in for a lot of work, but they did not object. The problem was up here on the Hill, getting kind of a uniform view as to what was important in NOAA. It got back to the issue of a NOAA charter, which we are not discussing right now, but there was the feeling that unless one were very careful in that omnibus authorization, there might be a wrong signal sent.

Senator Schmitt. Bill.

Mr. Hess. I agree with what Jack Townsend just said. When I was in NOAA, I felt the lack of opportunities to present results of our program and to discuss, the direction in which we were headed, with congressional committees. We did not have a good opportunity to do that in any orderly sense. There were occasional oversight hearings, but they did not look at the organization in an orderly way. I would suggest this is moving in the right direction.

Senator Schmitt. You have experienced a more orderly procedure with NASA. Is that the kind of thing you envision? Is that a more orderly general overview annually, even though some programs may be authorized multiannually, and when need arises have very specific focused hearings, but still within the context of the total program?

Mr. **Hess**. In general, yes. I was not close enough to the process during the time I was in NASA to give a detailed answer, but I think that is the right kind of system.

Mr. **Townsend**. I was in NASA, too, for 10 years. When I left NASA to go into what was then ESSA, I was really jealous of NASA's situation. We had in NASA an opportunity to present our successes and sometimes our problems on a yearly basis. But remember NASA had a limited number of projects. In ESSA, we had about one meaningful hearing a year before John Rooney of House Appropriations, and that was tough. We had absolutely no place to show our forward movement. Rather, oversight hearings in those early days tended to be called when somebody had blown a weather forecast. It was kind of, what the heck is going on here kind of thing.

Senator **Schmitt**. No pun intended, I am sure.

Mr. **Townsend**. No, but it is kind of hard to come up and respond just to your sins when you believe that there is some real progress being made, so I do not think there is any doubt that NASA benefitted by that procedure. Their projects are of a nature that I think an annual authorization is very appropriate. I think in NOAA's case you would want to look at which ones should be. I do not think you would want to make every one annual.

Senator **Schmitt**. Could we ask you and others on the panel that feel they have something out there to supply for our record the programs that you feel should be annual and those you feel should be multiannual, and for approximatley what length of time, just roughly, it would be very helpful to us to focus our attention on it.

Mr. **Townsend**. Surely.

Dr. **Calio**. The only one that comes to mind offhand is the weather service. It would be helpful to treat that as a multiyear activity.

Senator **Schmitt**. I guess you would like the climate program for 100 years.

Mr. **Townsend**. It may require that.

Senator **Schmitt**. I think it is clear from what has been said today as well as just commonsense that atmospheric processes do not respect State boundaries. If I am wrong, please correct me. Nevertheless, we do see an inclination on the part of at least the Office of Management and Budget, if not others, to curtail programs, and even with some statements that the States by themselves or the private sector by itself can handle some of these programs. I am not expressing an opinion one way or the other. I think there probably is a balance. Do you feel that the general concepts of New Federalism are applicable to the kinds of services that are provided by NOAA in the atmospheric area? We can let the private sector talk if you do not want to, Tony.

Mr. **Townsend**. I do not. As you probably gathered from my testimony, I do not believe there is a lot of applicability of the New Federalism concepts to the kinds of services that the Weather Service provides. In my testimony, I kind of alluded to a problem, but let me bring it out more forcibly. If you went too far in this direction you might well have a situation where the more wealthy States or counties or even cities would have very fancy weather services, whereas those that could not afford it would have lesser services. That might be all right for very short range forecasting, but it would not do, say, Maryland any good to have a first-class Weather Service if the States to the west of it did not. Beyond a matter of hours, or certainly on the order of less than 1 day, the forecasts would begin to deteriorate simply because you did not have observations. I do not believe that kind of a situation is what this country is all about. I think it is necessary to provide essential services like these to everybody irrespective of their ability to pay. In that sense I feel it is very analogous to the defense problem.

Senator SCHMITT. Doctor, you would agree, I think, that there are some services that State weather programs could provide. That would augment——

Mr. TOWNSEND. Yes.

Senator SCHMITT. The national program as well as specialized services by industry to serve particular other industries.

Mr. TOWNSEND. No question about that.

Senator SCHMITT. Value added types of services.

Mr. TOWNSEND. Yes. What I am talking about is the basic service. If you do not have that basic service, though, you cannot go to the value added. I have a good deal of respect for the private meteorologists and the things they have accomplished. Given the data, and they need the data, and given a reliable form of communication they can add a lot. They can tailor a forecast. My recollection is that the local counties around Washington buy private meteorological service to predict severe snow, because of the problem of clearing that snow. They get a tailored forecast, much more tailored than Dick's people can do even though they are sitting in Suitland.

They may be sitting there physically, and I cannot say they do not have windows there. They do have windows. But in general their concern is the overall picture not the local one. There are many other examples. The construction industry frequently uses private meteorologists. The offshore oil people do. Those are ideal situations, but the private meterologists cannot function unless they have the basic data, unless those data are communicated to them through the network in real time, and unless they have access to the various specialized products that the National Meteorological Center produces that have general applicability.

Senator SCHMITT. And you would not expect it to be feasible for the private sector or the States acting collectively to pull together that kind of basic information.

Mr. TOWNSEND. No, sir.

Senator SCHMITT. Does anybody disagree with that general analysis that would like to speak up?

Dr. CALIO. I do not believe, on the part of the administration, that we are trying to impose a federalism concept having to do with meteorological services. What needs to be considered, however, is the regional consideration, such as agricultural weather, for example. Is this an added value service that can be specified and tailored for a specific industry; and can that industry pay for it? These are the questions to be answered, but in no way are we asking the States to pick up the tab for a National Weather Service capability, or to pay for basic forecast. Therefore, it is not federalism. It is really a question——

Mr. TOWNSEND. Not yet.

Dr. Calio. A skeptic here.

Senator Schmitt. Tony, I am just saying, I think there are some hints in the way the priorities were established in this year's budget that may suggest that there are at least some, maybe not in NOAA, but across the street in OMB that feel that there are private sector capabilities that others may not feel the private sector will step forward and assume.

Dr. Calio. OK. I may be wrong, Senator. But I think it is more in the line of specific tailored products, such as agricultural weather, aviation weather, fire weather, and frost and freeze activities. Those, we think, can be tailored, and they do occur regionally, so they do have an impact on some specific States as opposed to others.

Senator Schmitt. Well, in that context, Tony, what should be NOAA's priority in atmospheric programs? Maintenance of present services, implementation of new technologies in order to improve future service, basic research, or some of these more tailored activities?

Dr. Calio. All of the above. The difficulty is trying to strike the balance. It is certainly absolutely essential that we maintain the basic core forecasting capability and try to do that as efficiently as possible. That necessitates research and development and the bringing on board of new technologies. So, the question is how do you make room for these things.

Senator Schmitt. Not many years ago, it was decided, probably correctly, that the private sector was never going to provide rural electrification or rural telephone service, so a Federal program was established to make sure that those services became available, and they did for the most part. In a similar way it was decided, I presume, in remote areas, weather stations such as those scheduled for closure now, were not going to be provided by the private sector and did provide a necessary service, so the Government stepped in to provide it. Do you think that the time has passed for those kinds of local, particularly rural services that tend to deal with agriculture, fire weather, and frost warnings?

Dr. Calio. That is the point. Can we aggregate that and provide regional information that could then be used by elements of the private sector to provide site-specific information? I think that could be done. We have to look at the basic raw data collection and how we distribute that data in an efficient way. This will probably require the use of automated systems to collect that data. I think there has to be some way in which we can develop the capability to reduce the manual operation that takes place in the system today, and to use more effective remote sensing techniques. I am not saying absolutely, but it may necessitate the closing of some manned stations and their replacement by automated systems. Some people may argue the other side of that, saying, they have to look out the window to see what is happening with the weather. Those are the tradeoffs that have to be made.

Senator Schmitt. But given the recent and foreseeable economics of agriculture, of forestry, more particularly the fruit industry, do you think that there is an economic base there that can support services currently supplied by NOAA?

Dr. **Calio**. The industry as a whole could support such services and certainly the productivity of the citrus fruitgrowers in the three areas where we provide fruit frost services have such financial capability. It is a big enough industry that they could indeed support an added value service there. That is my personal belief. Now, the question is, if it were purchased and distributed, how would such a service be managed?

Senator **Schmitt**. But the agricultural subeconomy in a large portion of this country is bankrupt right now.

Dr. **Calio**. The question is how may the larger industries carry the smaller industries through a private sector capability? The industry as a whole, the income from that, should be sufficient to support an added value service for specialized tailored products.

That is the question that has to be addressed, Senator, since one can always make the argument that the individual cannot afford such a service.

I think there are enough farm groups that can pool their power to be able to afford this kind of service. My colleagues may disagree with that.

Mr. **Townsend**. The issue here is really one of whether the market can be aggregated or not. In the case of the fruit frost, in this particuar case, I think it is a service that can be handled by private meteorologists. The industry is relatively well organized. It is localized in the sense of regions of the country; southern California, Texas, Florida, for example.

The service given is very specific. It has to do with two things, primarily, if memory serves me correctly. One, the frost itself, but also spraying for insect control.

On the other hand, go to the other end of the spectrum and look at trying to aggregate the many, many small farmers who still remain in this country who farm different types of crops. They have more generalized needs. They need to know soil moisture. They need to have temperature predictions. They need to know drying conditions. They also need to know when the optimum periods for insect control are.

In the harvesting area, they face problems all the way from the raisin growers out in California that have to have very good drying weather, to local hay farmers who are equally worried about that on this coast.

I do not know how you aggregate that market. And I am in industry now, and that is one of the things I keep beating into my people.

Senator **Schmitt**. You would like to be able to?

Mr. **Townsend**. I would like to be able to. I say, how can we aggregate this thing? It is the problem in LANDSAT, too.

Dr. **Calio**. May I bring up an example here from our past experience almost identical to this. If you recall, back about 4 or 5 years ago, NASA provided a free communications satellite capability as a public service through its application technology satellites. We felt that was an industry there.

The problem was that the individual users themselves could not pay for commercial services. So that the problem was to determine how the groups might be aggregated, so that they indeed could buy the services commercially and yet keep the unit costs down for them.

That was done. It was done successfully. We have two such organizations existing today, one in Appalachia and one here. The organizations work very effectively in satisfying public service needs to people who individually cannot afford those needs but in the aggregate, through these organizations, able to buy them commercially and distribute them.

I think Dr. Townsend is frowning.

Mr. **Townsend**. Oh, no. You are entirely correct. I was thinking, though——

Senator **Schmitt**. Statistically, his head was going up and down.

Mr. **Townsend**. I was thinking he did a good job. He was referring to two organizations that did an outstanding job. But out in the Pacific we have ATS-3, I think, still working, still being used for communications.

I have been out there twice now in the last couple of years on business, and everything I have heard on those islands is: What is going to happen to ATS-3? And NASA did just move it into a more favorable orbit. But there on those little islands, with those little economies, again you are going to face an aggregation problem which is very difficult, the whole Pacific.

Dr. **Calio**. The whole question is, How do we aggregate it effectively?

Senator **Schmitt**. What about weather modification, is that an aggregable service?

Dr. **Calio**. Weather modification, I think, needs some discussion as far as the service is concerned.

Senator **Schmitt**. You mean you share my concern that we do not know enough about the downwind effects of weather modification to really jump into it?

Dr. **Calio**. That is it.

Mr. **Ostenso**. That is the key. Right now it is premature to talk about aggregation. It is premature to talk about delivering the service, much less aggregating it. Over the last decade or two we have labored under the hope that we could short circuit the long and laborious task of basic understanding and go to some empirical methods of weather modification.

We have had two dramatic and many more less dramatic examples of the fact that it is just not going to happen. We must go back to basics. We have to look at the long-term understanding of basic microphysics in clouds, especially ice particles in clouds. For example, in hurricane modification, we have a whole new look now with the advent of Hurricane Allen. At that time, we had the first chance to apply some very powerful observational tools. We found out that our hypothesis with which we were trying to modify hurricanes was flawed. We are now developing a new hypothesis.

So the issue of weather modification is just as you stated, Senator, we have to go back to studying the basics.

Senator **Schmitt**. You said there were two examples. Would you provide us some summaries of those examples for our record, please?

Mr. **Ostenso**. I would be happy to.

[The information follows:]

EXAMPLE 1: PROJECT STORMFURY

After 20-year of measurements, modeling, and research studies and seeding experimentation in four mature hurricanes, NOAA decided early in 1981 to defer STORMFURY seeding activities indefinitely and concentrate future hurricane modification research on understanding the structure, dynamics, and microphysics of the hurricane system. This decision was motivated by discoveries made during recent research flights into Atlantic hurricanes, especially those over a six-day period in Hurricane Allen in 1980. Observations made possible by the instrumentation on the NOAA P-3 aircraft revealed that hurricanes are far more complex than previously envisioned and raised many questions concerning the hurricane seeding hypothesis. Changes in storm structure and intensity that are expected to result from seeding were observed to occur naturally in unseeded storms. In addition, the cloud physics observations suggest that the conditions required by the STORMFURY hypothesis—an abundance of supercooled liquid water and a paucity of ice crystals in the clouds to be seeded—may not occur in many hurricanes.

EXAMPLE 2: FLORIDA AREA CUMULUS EXPERIMENT

The Florida Area Cumulus Experiment (FACE) was a NOAA experiment designed to determine whether dynamic seeding can augment convective precipitation over a substantial area of South Florida by promoting the growth and organization of summer cumulus systems. Seeding experiments were conducted during eight summers between 1970 and 1980. FACE-1 (1970–1976) produced persuasive but not conclusive evidence that seeding enhanced precipitation over a 13,000 km^2 area under certain conditions. The second phase of the experiment (FACE-2) was conducted during 1978–1980 to confirm the tentative results achieved in the FACE exploratory phase. Again the results were positive but not statistically significant. One very wet no-seed day had tremendous impact on the statistical results. This result demonstrates how the large natural variability of precipitation rate and other weather phenomena makes it so difficult to attribute experimental results to our intervention using statistical procedures. Greater understanding of natural cloud processes and their interactions is needed.

Mr. **HESS**. Yes, I agree with my colleague, Dr. Ostenso, on this. I think we have gone backward in weather modification in the last 3 or 4 years. Things we thought we knew 3 or 4 years ago we now must admit we do not know. It is unclear whether we really understand how to modify orographic situations successfully now.

It is very clear that we do not understand how to modify convective clouds to augment rainfall or snowfall with any degree of certainty. There are people who are doing this business operationally, but if you really go back and ask them what are they achieving, you will, I think, in no cases find anything successful that can be demonstrated from operational systems.

From the research systems, when we did a review of weather modification a few years back, we thought there had been three successful experiments. That number is down to one now. The one successful experiment has been carried out for about 20 years in Israel. It does seem to work and it does produce about 10 to 15 percent additional water in the northern Israel drainage area. And that is an operational system.

In the United States we do not have any record of clearly demonstrated, statistically verifiable success, from such experiments.

Senator **SCHMITT**. What about inadvertent weather modification, such as that classic satellite picture from the early days of the space program that showed the snowpack downwind from a powerplant, I think, in St. Louis?

Mr. **HESS**. There are some fairly well established occurrences like this. The METROME experiment near St. Louis a few years ago showed an increase in rainfall in the downwind side of the city. I think one clearly must associate this with the effluents from the city's system. There are good indications that effuents from the Toronto industrial areas produce snowfalls across Lake Ontario.

Senator SCHMITT. But you are not yet ready to suggest that we build our powerplants upwind from agricultural areas?

Mr. HESS. No.

Senator SCHMITT. Or our cities. Are there any other comments on that? I do not think you are arguing that we should not be funding research in weather modification, are you? It is just that we are not ready to go operational, and you do not know when that will be?

Dr. CALIO. That is right.

Mr. HESS. Senator Cannon's point was completely valid. You want to go vigorously into a basic program of trying to understand the meteorological systems, to understand then the opportunities exist for successful weather modification. If you look carefully enough, there most certainly are some. We are not at that point in understanding meteorological systems from the microphysical viewpoint enough to really be able to select out those opportunities well.

Senator SCHMITT. Do you think we are doing enough considerin of the macro viewpoint in terms of what the other geographical areas would be if significant quantitative modifications——

Mr. HESS. The downwind effect.

Senator SCHMITT. Yes. The downwind effect, if you want to call it that.

Mr. HESS. That is a still harder area to work in. If you do not understand what is going on in the target area, it is even more difficult to understand what is going on in the downwind area. You can make a qualitative argument that says maybe nothing is going on in the downwind area, but it is not something——

Senator SCHMITT. I think there is a general understanding, is there not, of the role that hurricanes play in balancing on an annual basis the energy distribution within the atmosphere. Am I correct in that assumption?

Mr. HESS. In order to get poleward transport of heat, you have to have something resembling hurricanes in your meteorological system.

Senator SCHMITT. If we were able to develop a successful means worldwide of causing a loss of energy in a hurricane in the equatorial region so that they did not impact the higher latitudes, we would not be tampering with that energy distribution system?

Mr. HESS. No, not necessarily so. What you require is poleward transport of heat. It does not have to occur in systems that have rotating speeds of 100–150 miles an hour. Tropical storms carry large amounts of heat poleward.

Senator SCHMITT. So you think if all hurricanes were turned into tropical storms, we would be in good shape?

Mr. HESS. Oh, sure, we would. Come on, Jack.

Senator SCHMITT. I knew I would get an argument here if I kept at it.

Dr. Townsend.

Mr. TOWNSEND. I went along with him up to then.

But I cannot here. I think there is a lot of potential for mischief here, particularly when you really do not understand what you are doing, and the details of the nature of the convective process, which is what we are talking about here, in that transport. I also point out that hurricanes have a very beneficial effect in many areas in this country particlarly the eastern seaboard and around the north part of the Gulf of Mexico. They provide a lot of needed moisture in the fall.

Mr. **Hess**. But it does not have to be a hurricane. A tropical storm does just as well.

Mr. **Townsend**. I agree. But if you steer it off in the wrong direction—and I used to make the seed/no-seed decisions—there is potential for trouble. I do not know where the mischief is right now, but we thought we knew what we were doing with respect to the internal dynamics of the hurricane. We did not know very much about the steering. We convinced ourselves that the steering effect would be very small. But I do not think that was ever established.

Senator **Schmitt**. It sounds to me like this discussion, even with its disagreement, is a fairly good record justifying continued basic research both empirical and theoretical, would you say?

Mr. **Townsend**. Yes, sir.

Senator **Schmitt**. Tony, you seem like you are bursting, ready to say something.

Dr. **Calio**. No. I am fine. I was just reflecting on the opportunity for mischief.

Senator **Schmitt**. Tony, what was the request from NOAA to the OMB for atmospheric programs in 1983, OMB Memorandum A-10 notwithstanding?

Dr. **Calio**. I have to find that memo. I have it here, Senator. For all weather the request to OMB was $502,388,000. That is not including climate.

Senator **Schmitt**. Not including climate.

Dr. **Calio**. Not including climate.

Senator **Schmitt**. And your request to the Department of Commerce prior to submission to OMB?

Dr. **Calio**. $529,973,000. The combination of them all, including climate, to the Secretary was $556,225,000 and to OMB was $528,640,000.

Senator **Schmitt**. What efforts are you undertaking to streamline the delivery of service, so that you can get by with the lower than requested funds in the atmospheric program?

Dr. **Calio**. Starting off in the Weather Service, they are looking at a way of more efficiently streamlining the Weather Service in the collection and delivery of weather information and data.

I would like to ask Mr. Hallgren to outline a few things that he is undertaking there. Then I will add to that.

Mr. **Hallgren**. We have been constantly, over the last few years, trying to bring into operation a greater level of automation. For example, we are just bringing into full operation the AFOS system, which allows us, for example, to drive the NOAA weather wire circuit which provides all the public forecasts and warnings to the media automatically. And this gives us some relief in the individual stations in terms of personpower, concentrating on the meteorological situation. That is one example.

Second, we have been trying to automate a larger number of observing stations. In this case, we have been either backfilling in places, for example, where Coast Guard has departed and are no longer operating in the specific location, or enhancing the network which is rather minimal without any additional people.

We have also been trying to concentrate in working with the private sector in the dissemination of the weather information. We have been expanding our capability in NOAA weather wire to serve, for example, more cable TV stations. We have been generally focusing on the automation activities in order to increase our efficiency.

Dr. CALIO. Two other things I can bring to mind—we discussed one of them last Monday—was to reduce the number of polar-orbiting satellites from two to one. And the last example is the establishment of or expanding the scope of our user fees throughout the service.

Senator SCHMITT. Have you established some minimum funding levels in order to maintain the basic atmospheric services, including those of the laboratory in Boulder?

Dr. CALIO. No, we have not. I think that will come out in this current budget cycle. We have instituted an informal program review and planning process, which I am sure you are familiar with, essentially looking at a 5-year plan with a 10-year horizon. And, in establishing that plan, and in formulating our 1984 budget, we will build the plan from the bottom up and establish essentially what are the core levels in each of the areas within NOAA in which they might operate efficiently for the next few years.

That is in the process we are now organizing. I do not know whether Mr. Hallgren has a number for the weather service itself. But, we in NOAA do not have a number for each of those specific services.

Senator SCHMITT. Mr. Hallgren.

Mr. HALLGREN. We do not have a specific number in terms of dollars on funding levels. But, the way we have been operating in putting the proposals forward within the administration has been to give highest priority to maintaining the severe weather and flash flood warning service, at the level that we have had in the past.

Second, continue the more general public forecast as the second order of priority.

And third, the other programs that are related more to national service needs, we give the lowest priority. We have been practicing that as a priority list because we feel that allows us to maintain the core program, which is more important—namely, the warning service—and at the same time holds the second priority, public forecast, in reasonable shape.

We have been using that type of a priority system in a core program concept.

Senator SCHMITT. Mr. Hallgren, I do not argue with you that that is an important set of priorities. Would you explain how the kind of forecasting that significantly affects agriculture fits into that priority list, how it generally affects agriculture, not some very specialized services, but agriculture?

Agriculture is carrying an awfully big load in our economy. It is the principal means of maintaining some semblance of balance of payments with the rest of the world. Clearly, it is an essential activity for the population of this country.

The United States is in a unique geographical situation relative to its ability to produce food almost in comparison with any other country in the world. We have not yet learned how to really trade on that unique position and the capability of the American farmer and agricultural technology. But nevertheless, it is there.

We will, we must, rebuild the agricultural subeconomy. A great part of that in maximizing its potential would be in anticipating and preparing for weather disturbances that can be extremely costly.

Do you feel that that list of priorities adequately addresses the agricultural subeconomy?

Mr. HALLGREN. Well, it certainly is not as sensitive as I can see you would like it to be to the agricultural area. But, I would want to emphasize that the public forecasts are also used by the agricultural community in many of their activities.

What we would discontinue would be taking those forecasts that are the basic forecasts and tying them to the types of farming activities that are presently going on. This would have to be accomplished if we discontinued that activity, in one of two ways. The farmers in general could become more sensitive to the forecasts; in other words, get so that they could use the basic forecast to a greater degree than they have been accustomed to in the past. That would help some.

Second, would be that the private meteorologists would have to find a way to focus a marketable service—and we have already discussed the problem, and that is, how to aggregate the market in light of the small farmers. But, whenever you step back—and as director of the Weather Service, I have to put the priority to the warning service—it turns out, once you are able to maintain the warning service, the public forecasts, by and large, come naturally with little or no extra effort in terms of funding.

Within that, if we have a warning situation, we will even discontinue the public forecast, because the most important things are the warnings. If you are not under a severe condition, then the people in the weather station prepare those public forecasts. Those, in my mind, have to be the highest priority and within the budget constraints; some of the other services may fall by the wayside. That is what it really comes out to.

Senator SCHMITT. You do not think we need to have two highest priorities?

Mr. HALLGREN. That is one of the problems in the Weather Service, sir: everything turns out to be the highest priority. Therefore, we only have a category 1, and we have A, B, C, D under that.

Senator SCHMITT. It is great to be wanted.

Have you analyzed the citrus situation that developed with the severe weather this last season? It is my understanding, if I remember correctly, a 25-percent loss in the citrus crop of Florida; is that correct? Do you know? Is it about 25 percent?

Mr. HALLGREN. I believe it was in that vicinity.

Senator **Schmitt**. In the postmortem in the briefing, have you gone back and looked at how the Weather Service performed in that situation and whether you maximized the warning that was possible, given current technology and existing capabilities for the Florida citrus industry?

Mr. **Hallgren**. Yes, I analyzed how we performed on the one very severe outbreak and a couple of the slightly less severe outbreaks. I must say, the guys did a superb job.

As we all know, the critical temperatures for citrus crops are in the 26 to 28 degree Fahrenheit range. In the January 11–12 episode the temperatures fell way below that, but they were well forecast. And the decisions were made as to whether you protect trees or save crops. Also, our forecasts prior to January 16–17 correctly assured growers that the extreme cold wave in the north—the Siberian express—would not reach the citrus areas.

Senator **Schmitt**. Is there anything in this present budget, the reductions of this present budget, that would affect your ability to provide that service in the next fiscal year?

Mr. **Hallgren**. Yes, sir. It is proposed to be eliminated in terms of having special people for fruit frost forecasting. What we would fall back to would be providing the minimum temperature forecasts that are part of the basic forecasts throughout the area. We have divided the country up into what we call zones, where we prepare a forecast at least once a day and update it more frequently. In fact, in most of the zones we prepare forecasts three times a day. We would still be putting out zone forecasts, which would contain minimum temperature forecasts for that zone, which would be several counties, for example, in the Florida area.

Senator **Schmitt**. Would you expect, had that been implemented in fiscal year 1982, that there would have been a significantly greater loss of crops in the area?

Mr. **Hallgren**. I would have to answer yes. I think that the people in the station in Florida performed very well during this particular frost period, but I do believe this is one area in which the private sector, as Dr. Townsend and Dr. Calio have indicated, could pick up that type of service because it is in a relatively small area.

Senator **Schmitt**. Have you seen any indication that they are going to step forward and pick it up if this budget goes through?

Mr. **Hallgren**. There are, of course, even today a few people that are doing some forecasting in this area. It is one that I personally think they can pick on the private sector. The private sector can do the job. How they will step forward is not clear to me yet.

Senator **Schmitt**. Has NOAA ever thought of extending the battle analogy that was used earlier to the creation of a severe weather warning reserve corps of people who on a volunteer basis or even on a temporary salary basis, when it appears that a major weather threat is developing, would come in with experience and pretraining to help to augment the existing service for that effort?

Mr. **Hallgren**. Well, we do that, but not with professional meteorologists, because they are not usually available to carry out that type of activity.

Senator **Schmitt**. Has anybody ever asked them? We have people who join the National Guard and are pulled out on a reserve basis to take care of natural disasters. Has anybody ever asked the professional meteorologists whether they would like to be part of a reserve unit?

Mr. HALLGREN. There are not enough of us around, sir. But let me tell you how we do rely on reserve type personnel. In almost all of the areas where there is severe weather, we work very closely, for example, with the amateur radio operators, the police departments, and the civil defense people in the area.

There are many areas where, whenever we go into a warning mode and believe severe weather or flooding is going to develop, the police departments are fanned to locations and become part of the observer network, the amateur radio organization also becomes part of the observer network. It has been indicated here that, it is absolutely crucial to get a maximum density of observations during these particular periods. So we rely on this type of volunteer organization.

Senator SCHMITT. Are you reducing your capacity to utilize that volunteer organization with this budget?

Mr. HALLGREN. No. I think we will still maintain the quality of our warning process in this case. The only place where we would have additional difficulties is where we have to constantly recruit volunteer people and keep them trained, because they often are a changing group. We will be under more stress to do that, but we intend to do our very best to maintain those groups that we have.

I might mention one other group. There are 11,000 volunteer cooperative observers across this whole country that are taking observations, quite frankly, for little or no money.

Senator SCHMITT. I think my mother is one.

Mr. HALLGREN. We will have to send her a certificate. We had one that had been going for 74 years. So we do it in a number of ways that increase our capability during severe weather situations through the use of volunteers who are not meteorologists.

Senator SCHMITT. Dr. Townsend, I detected you might have a comment or two about that general discussion.

Mr. TOWNSEND. It did bring to mind that we did look at this once, but during the period when the Armed Services had a lot more meteorologists than they have right now. And it did look practical. My recollection is that an expected budget disaster did not materialize so we did not go through with it.

But the suggestion has some merit. I think, for a large storm like a hurricane where you have several day's notice, you could augment forces, and I think the Weather Service does this to some extent. I think the idea ought to be looked at a little bit. There may be something that could be done.

The unfortunate thing is that the tornado hazard covers such a wide area of our country, depending on the season, and the warning is so short that it is difficult even with airplanes to do research. We chased around, I know, for a long time trying to find and keep up with severe storms.

But I think the volunteer corps might have—there might be some merit to that, particularly if they could offload work from the people in the stations, communications and other duties. I do not know what the present status of the Armed Services——

Mr. **Hallgren**. They are very tight now, because they have been cut in half from what they were. But I probably should have amplified, the amateur radio operators do come in to the weather station now. In other words, they have a plan in an area, and some of them move out to become part of the observational force scattered around the territory. In addition, one or two radio amateurs come in to the weather station. That is how the communications are started. Those people, the amateur radio operators, are in the station and hand the observation reports to the forecasters. So we already have much of what you have suggested. We have completely instituted this kind of organization in the southern region of the Weather Service, and we are moving out as well in other regions.

I might add, we do work with FEMA very extensively. They set up emergency centers or activate them to a much higher level during severe weather. And we are cooperating fully with them. Sometimes we have a person in their facilities. Sometimes it is a part of our facility. So we do expand our capabilities in that regard to get the information disseminated.

Senator **Schmitt**. Well, thank you. I think as a final word on the overall cutbacks and specialized services, we have got to realize that in doing so, and particularly if there is a delay or if there is no pickup of those services by the private sector, that we are adding very, very large aggregate costs to the consumer in terms of increased prices for a very relatively modest budget savings. At this point we are looking at significant increases in prices taken in the aggregate, maybe only a penny here or a penny there, but taken in the aggregate it is a major new cost to the consumer of domestically produced food.

I am sure others will be taking a close look at that analysis. Finally, Tony, a relatively parochial subject. The closure of weather stations, what is the status of that now? The Congress did agree to close 18 stations this year and 20 more in fiscal 1983 I believe, you have indicated that you are proposing to keep 20 stations open for fiscal 1983. Does that change the status of the 18 that were slated for closure?

Dr. **Calio**. Let me say I walked through it. We called the House Appropriations Committee and suggested that we maintain the 38 stations for half a year. The Senate turned around and specified that we maintain specific 20 stations in operation for the full year, thus requiring to close down the other 18 in the middle of the year. Insufficient funds were provided to maintain those 20 stations for the full year operation. We have subsequently requested a reprograming authority which has subsequently been denied to keep those 20 stations open. We are discussing that with Members of Congress, and have essentially put on notice those of the 18 stations which will be closed down in the April, May, June timeframe. We are still trying to work out the reprograming activities with the Members of Congress which is now an open issue. Now that all the Members are back from recess, we think we can resolve the issue in the next couple of days, and the fate of those 20 stations will be determined at that time.

Senator **Schmitt**. We had better be very careful about equity here, because a number of Senators bit a very difficult political bullet on the 18, and then suddenly there were a lot of manipulations with respect to the 20, so I hope we do not get ourselves in the position of showing some discrimination here just because there was concern about the overall NOAA budget.

Dr. CALIO. I understand, Mr. Chairman.

Senator SCHMITT. Gentlemen, I wish we could go on. I would like to get back into some of the more technical and scientific aspects of things, but we will have to ask some questions for the record. Otherwise, we will not have time to discuss the climate program. Any of you who would like to stay at the desk for the discussion of the climate program, I would be happy to have you there. It is equally exciting, although obviously longer term. Otherwise, you are dismissed, gentlemen.

[The following information was subsequently received for the record:]

Senator SCHMITT. Our next witness, Dr. Alan Hecht, is director of the national climate program office.

STATEMENT OF ALAN D. HECHT, DIRECTOR, NATIONAL CLIMATE PROGRAM OFFICE, NOAA

Mr. HECHT. Thank you, Mr. Chairman.

Senator SCHMITT. Mr. Hecht, welcome. If you wish to summarize your testimony, it would be helpful. It will be included in its entirety in the record, and we will have a few questions for you.

Mr. HECHT. Thank you, Mr. Chairman.

It is a pleasure for me to appear before this committee. I have been on the job officially only 4 days, so I am especially pleased——

Senator SCHMITT. What took you so long to get up here?

Mr. HECHT. It did not take me very long. However, I am probably one of the few people here who is not associated with NASA. I hope you will not feel that a handicap. Actually, I have a long association with another equally exciting agency, the National Science Foundation, and I am going to draw on that experience of the past 6 years, almost one Senate term, in developing what I think is an extremely important program, the national climate program.

You have my testimony for the record. I will only make a few remarks about the overall mission and responsibility of the program, and some of the scientific opportunities that we will explore in the next several years.

I enjoyed the discussion this morning very much. It focused on problems of weather forecasting which, as you correctly pointed out, have a shorter time scale than climate problems. The difference between weather and climate is often hard to explain. I am going to talk of climate in terms of monthly, seasonal, and longer time atmospheric and ocean problems.

It is clear to all of us that the justification for a national climate program is as strong now as in 1978, when the act was passed, or in 1974, when a climate program plan was proposed by the then existing ICAS committee, or even back in the 1930's, when an experimental climate forecast program was initiated by the Department of Agriculture.

We can easily appreciate the value of reliable seasonal forecasts, for example, winter forecasts issued in November for December, January, and February. The operational responsibility for making these forecasts rests with the National Weather Service. The National Climate Program Act authorized the establishment of experimental climate forecast centers to develop and test improved methodology for making the forecasts. There are difficult scientific and operational problems in making long-range forecasts. I am going to talk later about what we might do in the future that pertains to these problems.

What is the national climate program? Why was it enacted? What is it all about? As an analog, let me draw on my experiences in the National Science Foundation to describe what a large integrated program can do. Several large-scale atmospheric, oceanographic, and paleoclimatic programs were begun in the 1970's by the National Science Foundation as part of the International Decade of Ocean Exploration. Many of the programs are completed and have achieved important breakthroughs in science and important technological applications.

By the time that these programs were developed, there was strong, debate about how to integrate activities of many researchers or institutions and whether it is better to have large programs rather than uncoordinated individual programs. For example, in the ocean science program, it was clear that there was an enormous benefit to be obtained from a coordinated research effort. Existing across the country were 8,000 ocean cores which could be studied from many purposes, and many universities concerned with long-term climate. Yet it was necessary to have a coordinated effort so that oceanographic cruises and data processing could be done systematically and focused on, the objectives of a well-stated scientific problem.

The national climate program is much broader than the ocean science program but it offers the same kind of benefits from integrating data sets, maximizing program services, focusing on research, and making assessments so that users requirements are relayed to research and operations.

The national climate program has evolved to a point where it coordinates long-range planning, sets priorities, represents the United States in international forums that have to do with climate. To do these things, it draws on long-established programs that exist in the Federal agencies.

It is nearly four years since the National Climate Program Act was passed. We have established program priorities and taken some steps to deal with problems of long-range forecasting, providing climate services, and assessing climate impacts. I think the goals now are to focus on these problems, formulate more specific priorities, and bring to bear on these problems all of our research and operational capabilities.

Let me cite one example of the kind of integrated effort that is needed. In the area of long-range climate forecasting, we must draw on scientific knowledge about the oceans and atmosphere. The research in these areas is done mainly through the National Science Foundation, NOAA, and the Department of Energy. The research activities of these and other agencies must be integrated to be efficient and well-focused. Operational forecasting, which is the responsibility of the National Weather Service, must be integrated with research so that opportunities for making improvements and testing new methodologies can be exploited promptly.

Finally, a third component of an experimental forecasting program is assessment and diagnostics—measuring climate impacts and telling the research and operational components of the program about the kind of forecasts needed, to whom they can be directed, and how they can be made more useful. A goal of the national climate program is to integrate all these activities. Making improvements in long-range forecasting is a responsibility of several agencies. Tailoring climate data services to the users is the responsibility of the climate program.

In the years ahead, I hope we can make great progress in bringing to bear on these problems our research, technological, and assessment capabilities.

Mr. Chairman, again, thank you for the opportunity to appear here, and I hope I can answer your questions.

Senator SCHMITT. I want to welcome you aboard. You should have an exciting time. It is certainly one of the most important scientific programs going on in the Federal Government, if measured only by its potential for impact, long-term impact on the economy and the well-being of human beings. Could you be more specific in how you would expect the program priorities in the 5-year plan to change under your leadership?

Mr. HECHT. I think the program priorities laid out in the 5-year plan are generally correct. They put the emphasis in the right areas. What is missing is the realization that these priorities are not all at the same stage of planning, organization, development, and implementation.

For example, one of the most important areas for climate research is understanding the role of the ocean in transporting heat. This is a high priority for feasibility studies and planning. By contrast, an equally high priority is providing climate services to the Nation. This requires better integration of our climate data and climate network and conversion of climate data to information products. This can be done. It does not require a feasibility study. It is at the point of implementation. What I hope we can do over the next several years is define our goals and principal activities better, focus them, separate those at the planning stage from those ready to be implemented, and move ahead with implementation.

Senator SCHMITT. What about coordination? Our last year's hearings indicated that coordination has been less than satisfactory between the various agencies. There was $150 billion aggregated in the climate programs of the Federal Government. How do you expect to improve interagency cooperation in this program?

Mr. HECHT. Part of the difficulty in the past has been in not knowing whether the program is leading the agencies or the agencies are leading the program, and in not having a clear understanding of agency responsibilities in the program. I think these difficulties will mostly be overcome by proposed changes in the act. The most important change is to establish an interagency policy board and give it responsibility for setting priorities and overseeing the program.

In the past, the policy board has not been very effective, even though the program has potential for an enormous impact on the budgets of Federal agencies. The best thing we can do is to convince agencies that this is a program that builds on and requires their skills. That is the essence of the program. It is too big for any one agency. The National Science Foundation cannot do it alone. NOAA cannot do it alone nor can the Department of Energy. But they can do it together.

We have a lot of experience with large-scale programs where agencies have worked together. In the months ahead we plan to convene this policy board, seek their guidance on current budget priorities and long-range scientific priorities, and see if we can move ahead with a better, more integrated effort.

Senator **Schmitt**. The 1983 budget request for this kind of activity is $1.1 million. Can you tell us how much you requested from NOAA in your original budget request?

[The following information was subsequently received for the record:]

The NCPO originally requested from NOAA an increase of $3.1 million over its base of 0.95 million. The present DOC/NOAA request to OMB calls for a total NCPO budget of $1.1 million for fiscal year 1983.

Mr. **Hecht**. You can see I am new.

Mr. **Calio**. This has all of our climate activities in it, Mr. Chairman.

Senator **Schmitt**. If you can supply it for the record, please do that, and what the progress of that request was, through the Department of Commerce to OMB.

Mr. **Hecht**. Let me just add a point on the budget for the National Climate Program Office. This is separate from the NOAA's climate program activities, just as it is separate from the other agency's activities. So in looking at the total picture of the National Climate Program, there are agency components, plus the components——

Senator **Schmitt**. I understand that your job is a coordinating position.

Mr. **Hecht**. Within that, though, the program office has direct responsibility for two programs. These are the experimental forecast center program and the Intergovernmental or Federal-State cooperative program, which is at the stage now of showing ways to use climate data more effectively. These are part of the national climate program, and their funding is provided through the program office.

Dr. **Calio**. On your question, Mr. Chairman, the amount of money asked by the Secretary to OMB, is very close to that requested by Congress. It is about $25 million totally in which the national climate program funds are also embedded. We will provide that for the record.

Senator **Schmitt**. Dr. Hecht, would you agree with the assessment that climate as a discipline or climate forecasting research as a discipline is still much in the position of needing to collect and systematically analyze a great deal of empirical data because the number of variables far exceeds the number of equations that you can define, and that until that transition period is passed through, it is going to be very difficult to develop models, regional or global, that truly reflect climate forecasting potential.

Mr. HECHT. Yes. This is an important point. Forecasting and meteorological capabilities often are driven by observations. The problem of climate forecasting, that is monthly, seasonal, and longer, is extremely complex. In making a forecast it is necessary to consider how the ocean, the atmosphere, and the cryosphere interact. It is not possible also to handle all the data on ocean conditions, such as changes in sea surface temperatures and weather anomalies, even though these can have important effects on seasonal climate.

There are signs now that new theoretical developments will aid long-range forecasting. These have to do with a better understanding of large-scale atmospheric phenomena over the tropical Pacific and Atlantic Oceans, referred to as the Southern Oscillation, or the El Nino, or the Walker Circulation, and coincident changes in surface temperatures. Within the last several years, we have seen some theoretical explanations of these changes as they relate to large atmospheric movements over continental North America. This is a new lead that could be of great importance in long-range forecasting.

Clearly, we are going to have to explore this new theory. New data will be needed, in addition to existing meteorological, historic, and paleoclimatic data, for testing models based on the new theory. The academic community as a whole has been pursuing this new lead for several years and is quite excited. I know many people in this community who are not easily excited and they have told me that this is a major new development.

In the next several years I hope we can pursue it, test it, see whether it fits into our long-range forecasting and what further leads are opened. But you are quite correct; the problem is complicated. It leads me to suggest that when one talks about the climate program and climate forecasting, you are dealing both with a long-range program which requires stability and a long-range problem which requires a long time to solve.

What I hope to do in my responsibility is to see that new ideas are constantly tested and that the right people are brought together to work on them. We need to create the institutional environment in the Federal Government and the academic community that will promote further advances. But it is going to be several years before benefits will accrue from any new leads that are developing now.

Senator SCHMITT. Doctor, do you believe that the entire potential data base of past and current climate-related information has been identified and can be tapped by the current computer network and number-crunching capacity available to your program?

Mr. HECHT. To some extent. I think a great deal of what needs to be done is identified. That does not mean it is being done. We are facing a technological revolution in data processing and satellite data and we have a fair understanding of the opportunities and the problems that need to be addressed. Within NOAA, staff at the National Climate Center in Asheville are well aware of the enormous problems of handling satellite data and they are struggling with what to do first and how to do it. Additionally, I think I bring a new perspective to parts of the climate program, and that is the need to improve the data capabilities of historic records which are a tremendous——

Senator SCHMITT. Now you are getting to where I was going.

Mr. HECHT. Let me give one example. In this country for many years we have pursued the idea that the instrumental record of 100 years—compiled by a network of stations across the United States—ought to be supplemented by other sources that go back 500 years. We can do this through a network of tree rings—a dendro climate network. By looking at the width and growth of trees, many of which are 400 or 500 years old, it is possible to document changes in precipitation and temperature for many regions of the United States, particularly the Western United States, where such a network is currently developed. It can be extended to the Eastern United States as well.

One of the most significant examples I can cite of the potential here comes from the small network in the Midwest. Tree ring analysis for Iowa shows, over the last 400 years, eight periods of long-term drought. Between 1816 and 1824 there was an extended period of drought comparable to the 1930's in central Iowa.

The information that is gleaned from tree ring analysis provides statistical evidence about the recurrent nature of these problems and for suggesting the kinds of water problems that must be taken into account in long-range agricultural and water resource planning. It opens the door, really, to extending the meteorological observation network over much longer time periods. Here there are both opportunities and ideas and part of my responsibility and part of Tony's is to give them some priority. We want to get the most benefit for our resources and to get the right kinds of data to our analysts.

Here is an area where I think we can make a very significant contribution.

Senator SCHMITT. Do you have sufficient computer capacity within this network, so to speak, or within the climate program as a whole to take on these problems?

Mr. HECHT. The biggest problem is to process satellite data because so much is available. Computer capabilities are not a problem so much as management of data. Archiving is a problem and so is the large-scale computer modeling, particularly in ocean and atmospheric modeling.

Senator SCHMITT. Is computer capacity larger than most available systems? Do you really get into modeling?

Mr. HECHT. I think we can do with existing computer systems, although many of them are saturated in terms of the time available on them. I know, for example, of difficulties at the National Center for Oceanic Research where many problems need to be addressed, but some of them can only be programed for the very large computers there. There is a discussion in the academic community about dedicating machines for ocean modeling which is not yet at a stage comparable to atmospheric modeling. Ocean modeling is going to require a large number of operations that can only be done on the most sophisticated computers.

Senator SCHMITT. There is a network developing now in New Mexico that encompasses three major laboratories. I do not know what their capacity situation is.

Mr. Hecht. NASA is getting a new machine. GFDL at Princeton has a new machine. In the long run we are going to need more computer capability to address the problems of ocean modeling.

Senator Schmitt. There are recent reports out of JPL of a change in solar output that I thought with a gut feeling got more press coverage than it probably deserved. Could you tell us just what that information was and whether it was as significant as the press reports tried to make it?

Mr. Hecht. I have seen the press reports. I do not know more than that. Let me just talk to the problem. As you know, in recent years the question of whether the solar constant is constant has been debated. A significant change, let us say, of 1 percent of the Sun will have enormous implications for climate. Even one-tenth of 1 percent. From the satellite observations that have been made over the last several years from NIMBUS, which has measured the solar variability for a period of several years, we have seen data which show a large variability, on the order of tenths of 1 percent, to the measured solar output. This is an extremely short-term record, and whether that change of that magnitude is going to continue or whether it will have an effect on surface climatology remains to be seen. During the period of satellite observation of the fluctuations that I just mentioned, we looked at surface observations at Mauna Loa and elsewhere to see if we could detect similar changes in other parameters that might be coincident with the period. To my knowledge none were observed, but I am not sure we fully understand how a change in the Sun's output would be integrated and transmitted through the feedback processes to the atmosphere, the ocean, the cryosphere and so on.

Other than this, I cannot say more on what the article means.

Senator Schmitt. However, there is fairly strong evidence that the cycles in solar output, particularly those that are systematic, the 11-year, and 22-year cycles are in some instances directly parallelable with certain types of climate phenomena here on Earth. John Firor and I at one time compared notes, and we concluded that the best example we knew about at that time was the depth of the Alaskan low and the precipitation in the Southwest, and particularly in southwestern New Mexico, which seems to be a very strong correlation. In fact, it is so strong that one could almost be convinced that they could at least give the agricultural community a greater than average or lower than average climate forecast for 5-year periods, 4- or 5-year periods. Do you know of any further activity along that line? Are there any other examples of where this 11-year, 22-year cycle exist?

Mr. Hecht. I have not seen any evidence to suggest that there is reason to rely on the solar cycle for climate prediction. Let me cite one specific example. It is tempting to relate the 11-year and 22-year solar cycles to drought in the Midwest, which recurs about every 20 years.

Several years ago some new information became available on this relationship. It is possible, using the tree ring network, to reconstruct a record of solar variability back for several hundred years. Over the period of direct observation, the correlation of sunspots and tree growth is quite good. If the data are extended back, the correlation between solar behavior and climate is, however, not consistent. That is to say, we see low sunspot activity during the Little Ice Age in the 17th and 18th centuries, and again during an earlier warm period in the 12th and 13th centuries. Thus the correlation of sunspot behavior and climate is conflicting.

Within the last 2 years, using both the tree ring data and the modern network of data, several investigators in NOAA and University of Arizona's Tree Ring Laboratory have looked very carefully at the spatial distribution of drought indices and sunspot behavior. What they have found is that in certain narrowly restricted areas in the Midwest, there is a persistence between drought occurrence and the 22-year sunspot cycle, but it is not spatially uniform. There are always exceptions.

The problem is, if you rely on this as a meteorological or climatic forecast, you can be wrong as many times as you can be right. When the sunspot cycle says you should be in store for a drought, it may occur, but it may not occur in the right regions. My personal view is that it is not reliable for forecasting. It is a research problem still to understand how the two fit together. What is the real meaning of sunspot behavior as it might relate to changes in the climate of the Earth? I take a very cautious view about suggestion's that solar variability and solar behavior can be used to forecast climate.

Senator SCHMITT. But you indicated in that discourse that in narrow geographic regions it may well be.

Mr. HECHT. It does appear to occur in some regions.

Senator SCHMITT. It is more than coincidence.

Mr. HECHT. I think that is true.

Senator SCHMITT. If you look at the Alaskan low, and when you look at a narrow area like southwestern New Mexico and southeastern Arizona where the records at least for the last 100 years suggest a very good correlation to the 11-year cycle, one could begin to apply that at least in a local level on an experimental basis.

What about the final question, the carbon dioxide issue? Do you feel that there are sufficient global data yet on carbon dioxide to know, one, whether we have seen a significant atmospheric change as a result of man's activities? Does that change relate to any historic changes or prehistoric changes in carbon dioxide activity, and whether the Earth's natural reservoir for the absorption of carbon dioxide is being overwhelmed at this time?

Mr. HECHT. The observational evidence for increasing carbon dioxide in the atmosphere is exceptionally good. I think it is a credit almost to one or two people back in 1955 and 1956, and 1957, particularly Dave Keeling at Scripps, that we have such a good record. To me, there is no problem in recognizing that here we are seeing an unusually clear, well-measured, precise signal that CO_2 in the atmosphere has increased some 20 to 30 parts per million over the last 20 or 30 years.

Geologically, we also see large-scale fluctuations in the CO_2 as measured from bubbles trapped in ice cores. What we find here is that during the Ice Age 19,000 years ago, the CO_2 level in the atmosphere was significantly less than it is today. Between that period of time and today we have just a sketch of how CO_2 has varied historically. The problem is not to document whether CO_2 is increasing in the atmosphere. That is well documented. The problem now is understanding what that is going to mean.

There are two parts to the problem. One, can we use our existing models and capabilities to understand and project out what a further rise in the CO_2 will mean to regional climate of the world. It is one thing to say on an average the global temperature might increase or decrease by a certain amount, but it is much more relevant to know what the climate variability is going to be like, and in what specific regions we might see warmings or coolings, or more precipitation, less precipitation. Understanding the regionality of climate change due to any perturbation in CO_2 or other trace gases is not before us at present. The models have not yet reached that point where they can do that.

The second aspect of the problem is proving that any climate change that occurs over the next decade, if one does occur, is actually due to CO_2. You may be aware of what is a well-publicized diagram which shows northern hemisphere temperatures over the last 100 years. In 1880 and 1890, temperatures were almost a full degree less than in 1940. The temperature rose in the 1940's. It has since come down a little bit has and fluctuated in the last 5 years.

Now, suppose temperatures were to take off again. The scientific problem would be to document if that rise is not related to CO_2.

So, there are very difficult problems in that regard. Perhaps the least problem to worry about is the knowledge that the CO_2 has in fact been rising. That is clearly documented. The impact is not so clear.

Senator SCHMITT. Well, you have some exciting things ahead of you, including a few questions we will ask for the record. We appreciate your appearance. We hope you will get your report, your annual report out in a reasonable period of time. It is late. Naughty, naughty. That is not a good way to start your career, in this job at any rate.

Mr. HECHT. Considering that I am new, Mr. Chairman, I assume you are talking to Dr. Calio.

Senator SCHMITT. Thank you very much. The hearing is recessed. We will see you on the next one.

Mr. HECHT. Thank you.

[The statement follows:]

STATEMENT OF ALAN D. HECHT, DIRECTOR, NATIONAL CLIMATE PROGRAM OFFICE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Mr. Chairman and members of the Subcommittee, I am pleased to appear before you today as the new Director of the National Climate Program Office and to bring you up to date on activities since your last hearings.

In the past year, considerable attention has been given to the National Climate Program, and to perceived problems in leadership, management and coordination. I am very concerned about these problems and am working closely with NOAA management to correct them. I am optimistic about the future and the ability of the NCPO to develop a well coordinated and respected National Program. On the whole during this period of budget reductions, Federal climate activities have fared relatively well. Generally, there has only been a slight decrease in the funding (about one percent) allocated to the various program elements. Attached to my testimony are tables showing those changes. The first experimental forecast center is operating at Scripps and a small amount of NCPO money has been tied together with funds from NSF, Scripps itself, and other parts of NOAA to create an effective experimental project.

The Federal-State cooperative program has shown that there are many opportunities to use climate information for better local and regional climate programs. Studies include the use of climate information in building design, land use planning, a public utility's analysis of new uses of data, and the use of educational TV to present climate information. Other studies are exploring cooperative regional programs in the North Central and North East regions, and are analyzing the potential for state programs in Connecticut, Pennsylvania, and Oregon. I am attaching a more descriptive report on this program to my testimony. In addition, the Program Office supported three other studies of improved climate information applications and climate data coordination.

The National Climate Program depends on lead agencies to direct the work carried out in six priority areas—"Principal Thrusts". During the last year, NOAA, leading the Principal Thrusts on climate observations and information services work, commenced a major effort to secure more user input into data and information production and dissemination. Two users workshops were held and the results are available. On another Principal Thrust, the Department of Energy (DOE) has the lead for CO_2 research and after a period of restructuring they have now put together an excellent program.

Looking to the future, a World Climate program is developing. The major climate problems and important concerns are global in nature. The answers are global as well.

Let me report briefly on progress in the National Climate Program and activities of the Program Office. Principal achievements and activities in our major areas are as follows:

CATEGORY I: PROVIDING CLIMATE PRODUCTS

Under NOAA's leadership, the Principal Thrust "Generation and Dissemination of Climate Information" focused attention on better identification and interaction with users of climate data. The Environmental Data and Information Service (EDIS) and NCPO formed a Climate Information Users' Group with broad representation from trade professions and business sectors. A workshop to identify users' needs and approaches for meeting them was held by the Environmental Data Information Service, in conjunction with the fourth conference on the Economic Value of Climate Information. The NCPO is funding several prototype projects to test techniques and demonstrate uses of climate data. For example, we have a project with Colorado State University to develop methods for estimating hourly temperatures from daily maximum and minimum temperatures. Hourly temperature data are needed for planning fuel-efficient heating systems. In Connecticut we are helping fund development of a climate data base needed for water supply planning. Regional climate programs are also being sponsored with joint Federal-State funding in the North Central and Northeastern States.

The Principal Thrust "Climate Prediction", also led by NOAA, made progress with the establishment of the Experimental Climate Forecast Center at the Scripps Institution of Oceanography, La Jolla, California. Even though climate forecasting is an experimental and highly uncertain skill, there is interest in determining what kind of climate forecasts and related information will be most useful. NOAA's Climate Analysis Center (CAC) addressed these needs at a workshop held with industrial and agricultural scientists. Proceedings of the workshop were published by CAC.

CATEGORY II: RESPONDING TO IMPACTS AND POLICY IMPLICATIONS OF CLIMATE

There continues to be much interest in trends and expected climate effects of increasing levels of carbon dioxide in the atmosphere. Leadership for the Principal Thrust in this area is provided by DOE. Major research activities during the year have concentrated on measuring the increase in atmospheric carbon dioxide and evaluating its direct effects on climate and vegetation. Interagency cooperation in this area is noteworthy, as demonstrated by joint agency support for many research projects and by interagency planning of future research directions.

The Principal Thrust "Climate and World Food Production", led by USDA includes a broad range of agricultural research and crop assessment activities which take account of climate variability. Increased research attention is being given to understanding plant/climate relationships, and development of crop yield models suitable for regional and national production assessment.

CATEGORY III: UNDERSTANDING CLIMATE

The Principal Thrusts in this category address the two areas also recognized in the World Climate Research Program: radiant energy and oceanic heat. Both are necessary for modeling and forecasting climate.

Solar and earth radiation constitutes a Principal Thrust of the National Climate Program because the Earth as a planet receives and gives off energy only through radiative means, chiefly as shortwave (solar) radiation and longwave radiation. Energy flows to and from the earth in these two spectral regions are influenced, though in different ways, by the make-up of the planetary atmosphere and the characteristics of land, snow and water surfaces. Monitoring atmospheric conditions that affect these energy flows has begun on a planetary scale with NASA as lead agency, and summaries of aerosols and ozone were compiled on a global basis; further studies were done on effects of aerosols from Mt. St. Helens, and on gases other than CO_2 which are radiatively active and present in low concentrations in the atmosphere. Cloudiness data have been used in climate models, and monitoring of this important factor is being intensified. Solar variability has now been measured accurately for a few years, and found to vary over short periods by 2-3 watts per square meter. The variability of the sun has been suspected for a century but could not be accurately measured without satellite observations. Studies of longwave radiation going out from the planet show variability with season and latitude, and also differ between the Northern and Southern Hemispheres. As record-keeping of clouds and aerosols continues, the radiative energy basis of climate can be modelled more realistically and the effects on the variability of climate better understood.

The transfer and storage of ocean heat constitute another Principal Thrust because the oceans, which make up 75 percent of the earth, are good absorbers of energy from the sun. The way in which this energy is distributed in the ocean and returned to the atmosphere affect the variability of the planetary climate. For example, the ocean transports heat efficiently from low latitudes to high. In high latitudes this heat enters into seasonal and other variations in climate of the adjacent lands. Movement of heat poleward is, however, unsteady, and is affected by year-to-year differences in ocean temperatures and currents. In 1981, research on the Southern Oscillation, the El Nino phenomenon, and the patterns of equatorial oceanic temperature amonalies has led to a better understanding of the relationships between Pacific sea-surface temperature anomalies and North American winter weather. These studies, led by NSF as lead agency and NOAA, may in the long run lead to new methods of long range climate prediction.

An important function of the National Climate Program is to adapt participation in international activities to U.S. climate priorities. In climate, international agencies have been quite active. This is particularly true of the World Meteorological Organization and the International Council of Scientific Unions. The World Climate Research Program seeks to carry out many cooperative research projects, and it is our responsibility to see that U.S. interests are both coordinated and strongly represented.

Finally, I would like to report briefly on the specific activities of the Program Office itself.

The Intergovernmental Climate Program is a major initiative of the Principal Thrust on climate information. Each project in this program is designed to demonstrate the value of climate information for present use. The Program Office has released an informal letter describing the current projects and future plans.

The other major program responsibility carried out by the Program Office is for experimental climate forecasting. Last year we established the first Experimental Climate Forecast Center at Scripps. The immediate objective of this Center is to provide and verify experimental forecasts of temperature and precipitation for each season of the conterminous United States. Experiments also are being conducted on seasonal forecasting one and two seasons in advance. Three different and independent forecast procedures developed by the Scripps climate research group are being tested. An important component of the testing underway is to develop effective methods of determining forecast skill.

Forecasts of seasonal air temperature and precipitation in three classes (above average, average or normal, and below average) were prepared at Scripps for summer and fall 1981 and winter 1981-82 from a blend of very large scale ocean and atmosphere indicators. These include variations in surface temperature of the North Pacific, upper atmospheric pressure fields over the Northern Hemisphere, and near-surface air temperature over the continental United States. Synoptic, statistical, and physical relationships were combined in making these forecasts. Computerization of the records of past forecasts and observations has made possible the development of forecast verification methods. Calculations have been made of the statistical probabilities of correct forecasts and of the degree to which the forecast misses the observed condition. A specified high level of accuracy was reached by only one temperature forecast method in the summer of 1980, but by all four in the summer of 1981. This new verification method is useful for ranking forecasts and forecasting methods, and for rating the predictability of a particular season.

The Program Office also has supported research and application tests leading to the use of advanced technology for obtaining and analyzing climate data. Research completed at the University of Florida demonstrated the feasibility of using satellite data to identify areas in the State most likely to experience damaging cold temperatures. The location and size of these area varies from year to year but is remarkably persistent for a given season, once identified. The University of Nebraska is doing research on ways to collect and use automated hourly data to schedule application of irrigation water. Other agricultural applications of the data also are being explored, such as for grain drying, and pest and disease management.

As part of another study supported by the Program Office, the University of Wisconsin convened a Workshop of specialists in climate information development and applications. The Workshop participants discussed the quality of data available to them and made specific recommendations for measurements needed in urban applications and to improve the coordination of data acquisition and dissemination.

Members of the Program Office also carry out research. A staff member of the Program Office and the former Director recently published a paper in Science which reported the relationship between the rise in global mean sea level, polar ice melting, and changes in global air temperature. The paper received considerable attention in the press.

Since it was established, the Program Office has initiated or contributed to a number of workshops and conferences to improve program planning and implementation, and to help integrate the climate community. It has sponsored or supported activity on such topics as impacts of climate change, users' requirements, planning climate data networks and information systems, and diagnosing or understanding recent climate. We foresee even greater emphasis in the future being given to program planning and development activities such as these.

That concludes my testimony, Mr. Chairman. I will be glad to respond to any questions you have.

FISCAL YEAR 1983 NATIONAL CLIMATE PROGRAM BUDGET AUTHORITY REQUEST SUMMARY BY FUNCTION

Program areas	USDA	DOC (NOAA)	DOD	DOE	DOI	NASA	NSF	Total
Impact assessment	13.5	1.5	0.1	3.2	1.2		0.9	20.4
Climate system research		6.6	2.4	5.9	1.0	3.2	27.5	46.6
Observations and monitoring	1.5	5.0				29.7	8.5	44.7
Data management	0.5	6.4	0.7		1.2	0.8	0.9	10.5
Analysis and prediction	1.6	2.2						3.8
Information services	1.1	2.0	8.6					11.7
National program management		1.0						1.0
Total	18.2	24.7	11.8	9.1	3.4	33.7	37.8	138.7

NATIONAL CLIMATE PROGRAM BUDGET HISTORY BY PROGRAM ELEMENT

[Budget Authority, in million of dollars]

	Fiscal years—		
	1981	1982	1983
Impact assessment	18.4	20.6	20.4
Climate system research	48.3	49.4	46.6
Observations and monitoring	40.0	44.4	44.7
Data management	12.4	10.8	10.5
Analysis and prediction	3.6	3.6	3.8
Information services	10.0	10.5	11.7
National program management	1.0	1.0	1.0

NATIONAL CLIMATE PROGRAM BUDGET HISTORY BY PROGRAM ELEMENT—Continued

[Budget Authority, in million of dollars]

	Fiscal years—		
	1981	1982	1983
Total	133.7	140.3	138.7

QUESTIONS OF THE COMMITTEE AND THE ANSWERS THERETO

Question 1. How do you see your priorities for the U.S. Climate Program as being responsive to the plans and priorities of the World Climate Program? And conversely, how do the plans and priorities of the World Program match up with our national needs?

Answer. The U.S. was the first nation to formally establish a national climate program, and we were very active in planning the World Climate Program. In the way they are structured, the World Climate Program and the U.S. Climate Program have a close resemblance. The problem of climate change is global and concerns all nations. One of the most important advantages of the World Climate Program is that many nations can contribute observed meterological or oceanographic data to the study and understanding of global climate. This serves U.S. interests because we need global data for our climate research as well as for our operational climate services.

Another common interest that will be addressed in the World Climate Program is in understanding and responding to natural and human-caused variation in climate. Many countries, including the United States, are concerned with the impact of climate variation on world food production. International interest also is shown in measuring increases in atmospheric carbon dioxide, and in research to detect climate change that may result from the increases.

Question 2. The National Climate Program Advisory Board suggested a number of changes in the National Climate Program. We would like to hear your opinion on these proposals.

Answer. The Advisory Committee's recommendations for legislation were formulated jointly with representatives of the National Academy of Science's Climate Board and the Association of State Climatologists. Working level representatives of cooperating Federal agencies were invited to comment on the recommendations as they were being developed. I was the working group member from NSF at that time and I followed closely the development of the recommendations.

The most important recommendation and the legislative action most needed, in my view, is to formally establish an interagency Climate Program Policy Board having overall responsibility for the entire program. I fully support also the Advisory Committee's recommendation to define more clearly the functions of the Program Office, including its role in support of the Policy Board and serving as the focal point for international coordination of international climate-related affairs. It was the Committee's further recommendation that the Program Office be given greater visibility in NOAA. The recent reorganization of NOAA achieved this. The Program Office is now located in the Office of the Administrator and I report directly to Dr. Byrne. The Advisory Committee also recommended changes in the Intergovernmental Climate Program which I think are needed, particularly to remove the matching grant provisions of the Act.

Question 3. What is your opinion on the achievements of the NCP Advisory Board. Do you support continuation or abolishment of the Board in favor of a more powerful NCP Policy Board, which would consist of department of division heads of the agencies involved in the national climate program?

Answer. I will answer the last part of that question first. I fully support establishment of an interagency Policy Board with the necessary authority and responsibility to direct the Program. My view, however, is that an advisory body which provides expert views and guidance from outside the Federal Government is needed and that it supports—rather than competes with—an effective and responsive Program. It should be clearly understood that the two bodies have quite different functions. The Policy Board provides Executive Branch direction whereas the Advisory Committee is a source of external views on scientific and program matters.

The Advisory Committee has contributed to the National Climate Program—most notably in last year's studies leading to recommendations for changing the National

Climate Program Act. However, the Advisory Committee could be abolished and its functions assumed by the Climate Board of the National Academy of Sciences, which is also a non-Federal advisory group. During the first 18 months after the Act was passed, the statutory Advisory Committee was not available—because it had not been formed—to help with planning and program development. During that time, outside views and scientific guidance was provided by the NAS Climate Board. We are working with both groups and value their counsel. There has been some duplication of membership on the Advisory Committee and the Climate Board, and they are generally consistent in their recommendations, so it seems reasonable not to continue to support both groups.

QUESTIONS OF THE MINORITY AND THE ANSWERS OF NOAA

Question 1. Weather modification has a special concern for us in my home state of Nevada. Thanks largely to the fine work of the Desert Researh Institute, we are finding we can increase the winter snowpack in the Sierra Nevada and thereby add to the spring runoffs. Last year I introduced S. 607, the Weather Modification Act of 1981. Among other things the bill declares a national policy on weather modification and establishes a program of much needed research.

Nevada and other states are showing an interest in doing something about our water supply. Isn't it about time for a national weather modification policy on the Federal level? I would appreciate your comments on S. 607.

Answer. NOAA's activities in weather modification involve primarily a program of fundamental research on the nature and behavior of clouds and cloud systems. This program should answer the key questions needed to place weather modification on a sound scientific basis. It is NOAA's view that the present level of activity in this field does not warrant additional Federal legislation at this time.

Question 2. Given the huge amounts of disaster relief money we spend every year on weather-related events, it seems to me we should be willing to spend money searching for ways to prevent or modify weather. Isn't it shortsighted of the Administration to cut $6 million out of the NOAA weather modification program? Please explain why you have decided to cut this funding.

Answer. NOAA believes that weather modification has the potential for improving atmospheric conditions for the benefit of society—especially precipitation enhancement and severe storm mitigation—and we have pursued an active research program directed toward those objectives. We also believe that ultimate success will require a long-term program of fundamental research to gain greater understanding of key physical processes. NOAA's primary mission is to provide services while conducting research and development activities to maintain and improve those services. Because of the Administration's desire to reduce the level of Federal expenditures, budget reductions are necessary. We have decided to reduce those areas that we feel will have the least short-range impact on the continuation of vital services.

Question 3. Last year the Administration proposed closing the weather station in Elko, Nevada, which provides locally adapted forecasts and warnings for a thriving but vulnerable cattle ranching area of my state. The Administration also proposed downgrading the Reno Forecast Office which would have meant shifting all the way to Salt Lake City the primary responsibility for developing northern Nevada forecasts.

We were successful in reinstating both of those weather operations last year. Can we be confident that these operations will continue?

Answer. An emergency supplemental appropriation measure is presently before Congress which includes funds to operate 38-part-time Weather Service Offices, including Elko, Nevada, and 8 Weather Service Forecast Offices, including Reno, Nevada. Unless this measure is approved, these offices will be closed June 20, 1982.

Question 4. Our country's weather forecasting has been dependent since 1956 on the present radar weather systems. This radar has been in use so long the Weather Service has had to cannibalize its own equipment because there are not spare parts being made anymore. That's why NOAA set out to develop the Next Generation Radar (NEXRAD). Now the Administration is proposing further delays in putting NEXRAD in place. Isn't this terribly shortsighted? Don't we risk degrading the qualities of our weather forecast?

Answer. The WSR-57 which is the primary weather radar system in the National Weather Service is a 1957 design. Inventories of spare parts to support operations are becoming depleted and new parts are difficult to obtain because of the outdated technology involved. (The WRS-57 uses vacuum tube technology.)

In support of the President's Economic Recovery Program, we believe that first priority must be to the delivery of essential forecasting and storm-warni services on which government agencies and the general public rely today. It is recognized, however, that delays in implementation of the NEXRAD system will necessitate use of manpower and dollar resources to maintain the operation of the existing system.

Question 5. Aviation Area Forecasts are presently prepared on a regional basis in nine different locations around the continential United States. These forecasts incorporate the considerable regional expertise of the forecasters at these sites, and are of great importance to aviation. Now, in order to reduce personnel by 18 people and save $400,000, the Administration is proposing to eliminate this function in eight of the nine locations and centralize it in one place. With this loss of regional expertise, won't there be an additional risk to the aviation sector due to the lack of detail in aviation forecasts?

Answer. Loss of detail resulting from the centralized preparation of the Aviation Area Forecasts and in flight Advisories is expected to be insignificantly small. This concentration of personnel will have as their sole responsibility the preparation of these forecasts. This centralized staff will have an excellent overview because they will constantly be working with the total weather situation across the Nation as they develop a continuing assesment of its impact on aviation. Additionally, National Weather Service personnel who work in the FAA Air Route Traffic Control Centers will coordinate closely with respect to local aviation weather problems.

Centralized aviation expertise already exists at the proposed forecast center in Kansas City. This has been demonstrated by the success of the Convective SIGMET (aviation thunderstorm warning) service that was begun in 1978. This staff, experienced in preparing a national aviation product, will be capable of providing a service of comparable quality.

Question 6. The Administration has proposed that we can do without two polar orbiting weather satellites. It has suggested that one such satellite, along with the geostationary weather satellites, will do the job of two with little impact on forecasting in the United States.

Isn't it true that the forecasts developed in most of Alaska—where the weather is often severe—are derived principally from polar satellite data and imagery? Will the elimination of one of the two satellites make a difference for Alaska forecasts?

Answer. It is true that GOES imagery is of limited value in Alaska and that the polar orbiter data are used extensively in forecasting in Alaska. With two polar orbiters, Alaska is viewed about every hour and forty minutes beginning on a typical day around 2:45 a.m. and ending at 8:20 p.m., consisting of 12 satellite overflights seeing at least part, if not all, of Alaska each overflight. With a one-polar system, the overflights would be cut in half with coverage at 2:45 a.m., 4:25., and 6:05 a.m. The next overflights would be at 12:25 p.m., 2:05 p.m., and 3:45 p.m.

Question 7. Small agricultural businesses are responsible for much of the food production in this country. Many of these businesses rely extensively on the fire and agricultural weather programs of NOAA. The proposed cuts in these programs have been justified mainly on the theory that the private sector should perform these services.

Is there any indication that the private sector is interested in providing these services to small businesses at an affordable cost?

Answer. The National Weather Service has been contacted by a number of private meteorological firms that are interested in providing agricultural weather services to meet the special needs of the farming community. Most of the interest has revolved around the more localized fruit frost services. It is probable that cooperative organizations representing small farmers will contract for services for the entire group. This collective purchase of only those services that the groups need will keep the individual costs in the affordable range.

We are discussing with representatives of private industrial meteorological firms possibilities of providing similar services to meet special fire weather needs.

[Whereupon, at 12:03 p.m., the committee was recessed, subject to the call of the Chair.]

NOAA OMNIBUS AUTHORIZATION

THURSDAY, APRIL 22, 1982

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, D.C.

The committee met, pursuant to recess, at 10:14 a.m. in room 235 Russell Senate Office Building, Hon. Harrison J. Schmitt, presiding.

OPENING STATEMENT BY SENATOR SCHMITT

Senator SCHMITT. Ladies and gentlemen, welcome to the third of our four hearings before the Committee on Commerce, Science, and Transportation dealing with the National Oceanic and Atmospheric Administration.

On April 19 we heard testimony on NOAA's satellite services, and yesterday we concluded the agency's atmospheric programs. Today we will be addressing NOAA's ocean programs. On April 30 the committee will take up the Fishery Conservation and Management Act reauthorization along with other living marine resources programs.

This is the first year the Committee on Commerce, Science, and Transportation has considered an omnibus authorization bill for essentially all of NOAA's programs. The purpose of this initiative is to permit regular review of the research science, regulatory efforts and plans of this agency, which was created in 1970 to improve the Nation's understanding of management and conservation of marine and atmospheric resources.

While I refer to NOAA as young at times, we should note that some of its components are among the oldest in the Federal Government. The National Ocean Survey, for example, traces its origins to 1807.

Since its creation as a single agency in 1970, a number of additional responsibilities have been delegated to NOAA by law, as for example the Deep Seabed Hard Minerals Resources Act, the Ocean Thermal Energy Conversion Act of 1980, and the Coastal Zone Management Act of 1972.

Authorizations for NOAA are now contained in over 100 Public Laws, many of which are handled by line-item appropriations without any detailed consideration by an authorizing committee. The unprecedented growth and responsibility of NOAA requires a more deliberate comprehensive overview of NOAA as an agency. This committee can no longer authorize various programs within NOAA without considering the agency as an entity, nor should we as a

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committee authorize some programs while allowing effective authorization control to lie solely within the Appropriations Committee of the Senate.

Of special concern to the committee today is authorization of four specific acts. These are: The Deep Seabed Hard Minerals Resources Act, the Ocean Pollution Planning Act, title II of the Marine Protection, Research, and Sanctuaries Act, and the National Advisory Committee on Oceans and Atmosphere Act.

In addition, we will examine the status and progress of some additional ocean and coastal programs. Today we are fortunate in having with us Dr. Byrne, the administrator of NOAA. But before calling him to the table, I would yield to Senator Long, and I believe that he not only may have a statement but he may have someone he would like the committee to hear from.

Senator LONG. Mr. Chairman, thank you very much.

I would hope at some time early in the meeting to have a chance to address questions to Mr. Burt Keenan, who is,. I believe, appearing with Dr. John A. Knauss, who is acting chairman of the National Advisory Committee on Ocean and Atmosphere.

Senator SCHMITT. If the Senator wishes, we can take him early, depending upon your schedule.

Senator LONG. I wish you would, because I have to be out of here by 11 o'clock.

Senator SCHMITT. Then after the other Senators have a chance for their comments, if there are any, why do we not ask that Mr. Knauss come forward, and you could do that now along with Mr. Burt Keenan.

If you will come forward, we will hear from Senator Gorton, if he has a statement.

OPENING STATEMENT BY SENATOR GORTON

Senator GORTON. Briefly, Mr. Chairman. I am pleased to be here today to review and hear testimony on the many ocean programs under the jurisdiction of the National Oceanic and Atmospheric Administration.

NOAA's missions range from the collection and analysis of data derived from the upper reaches of the atmosphere to the translation of such information for use among other purposes in forecasting weather for the general public and for special groups whose livelihood depends upon accurate weather forecasting, the sound management of land and coastal resources to the management, development, and further understanding of resources within and beneath the seas.

These are truly diverse and challenging tasks. And NOAA has always risen to the challenge and performed admirably, often breaking new ground, such as in its pioneering work with polymetallic sulfide ore deposits on the sea floor.

Today we will review the multiplicity of oceans programs which are the responsibility of NOAA and part of an omnibus approach. I look forward to learning more about NOAA's accomplishments in the past and about its plans for the future.

Senator SCHMITT. Thank you, Senator.

Senator Riegle, who is the ranking member of the Science, Technology, and Space Subcommittee, under whose general auspices we meet today. Senator Riegle.

OPENING STATEMENT BY SENATOR RIEGLE

Senator RIEGLE. Thank you, Mr. Chairman.

One issue which will be addressed today and which is of particular importance to me as a Senator representing a Great Lakes State is the status of research on the Great Lakes.

It is important, I think, to note that the Great Lakes are a valuable national resource which contain 95 percent of the surface fresh water in the United States. The lakes lie within the most heavily populated and industrialized region of the Nation and, as such are under increasingly heavy pressure to provide clean drinking water for nearly 25 million U.S. citizens, to provide high-quality industrial water for a variety of manufacturers on the various coasts of the Great Lakes, to provide recreational opportunities for over 60 million people, and, in addition, to provide a navigable transportation route for 200 million tons of goods each year.

So the economic importance of the Great Lakes is undisputed. And in fact, the recreational fishery alone has an estimated value of over $1 billion a year. However, the Great Lakes should not be considered solely as a regional or national resource. They are an international resource whose use and responsibility we share with our Canadian neighbors.

In fact, in the last 70 years we have signed three treaties: The Boundary Waters Treaty of 1909, the Great Lakes Water Quality Agreement of 1972, and the Great Lakes Water Quality Agreement of 1978, in which we made a commitment to undertake the joint responsibility of maintaining the quality of the lakes.

In the most recent of these treaties, the 1978 Water Quality Agreement, the U.S. pledged to intensify its research efforts to determine the effects of toxic pollution and other substances on human health, fishery resources, and wildlife of the Great Lakes basin.

We further committed ourselves to providing the necessary funds required to implement the agreement, including the funds needed to develop and sustain those programs which address the problem of pollution abatement.

The Great Lakes Environmental Research Laboratory in Ann Arbor, Mich., conducts research which is the keystone for effective implementation of this agreement and is vital to our national marine research effort.

The laboratory is a multidisciplinary research laboratory with an exemplary productive track record. Its mission is to conduct research to improve understanding of the lakes' atmosphere, land, environmental system, and to apply this understanding to assist in solving problems in resource management and environmental services.

In fulfilling this mission, the lab addresses such major problems as water levels, ice prediction, lake circulation, surface waves and oscillations, and pollution monitoring. These activities are critical to lake transportation, water navigation, search and rescue operations, water quality, and the general health and safety of the population.

The lab staff works in conjunction with Great Lakes regulatory and management agencies in both Canada and the United States and provides them with the research products, data, and expertise they need. The services of the lab are also utilized by private industry, individual citizens, and serve as a major resource for universities.

Termination of the Great Lakes Environmental Research Lab would thus eliminate the Nation's No. 1 one Great Lakes research team, deprive the Great Lakes resource managers and users of vital scientific information, and lead in the end to costly and ineffective Great Lakes decisions.

The closing of this lab, along with other important Great Lakes research facilities, would virtually eliminate Federal research commitments to this invaluable resource. The Great Lakes belong to no one State or no one Nation. And as such, they require the active commitment of all of us. I strongly feel that we should honor our commitment to the citizens of our country, to Canada, and to the world, and do all in our power to protect this unique natural resource that benefits all of mankind.

Now, Mr. Chairman, I obviously feel very strongly about this specific point, enough so to make this statement at the outset. And I will have questions on this matter and other matters that I will either raise in the course of the discussion today or will submit for the record.

And I thank the chairman.

Senator SCHMITT. Thank you, Senator.

Now, if we may, Dr. Knauss, if you would present your statement, we try to limit our witnesses as well as our questions to 5 minutes but that is not hard and fast. We would just like for you to try to hold to that in summarizing.

Your entire statement will be made a part of the record. Please proceed, Dr. Knauss.

STATEMENT OF DR. JOHN A. KNAUSS, CHAIRMAN, NATIONAL ADVISORY COMMITTEE ON OCEANS AND ATMOSPHERE, ACCOMPANIED BY BURT KEENAN, CHAIRMAN, NACOA PANEL ON MARINE MINERAL MINING

Dr. KNAUSS. Thank you, Mr. Chairman. I would like to note that I am the chairman of NACOA. And Mr. Burt Keenan, who is with me today from Louisiana, is also a member of NACOA.

As you point out, we do have a full statement which we would like to submit for the record. I would like to summarize the highlights.

Senator SCHMITT. Dr. Knauss, if I may, I think it would be appropriate to put in the record at this point that Mr. Keenan is chairman of the Task Force on Offshore Oil Production for NACOA, if I am not mistaken. Is that correct?

Mr. KEENAN. That is actually not correct. I am chairman of a NACOA panel for a review to recommend to the Congress and the President policy involving marine mineral exploration, the mining of deep sea minerals in general.

Senator **Schmitt**. Thank you for correcting the record.

Dr. Knauss.

Dr. **Knauss**. Let me summarize some of the issues which NACOA has undertaken, and let me do it, sir, in the order in which you put them in your letter when you wrote to NACOA asking us to testify.

First, on the National Ocean Survey. NACOA has made two recommendations that directly affect NOS in our report, "Ocean Services for the Nation." Recommendations include such things as the criteria for redoing old surveys. These should be reexamined to preclude resurveying except in areas with proven inaccuracies such as pose dangers to navigation. This would free ship time for higher priorities.

The feasibility of transforming mapping and charting practices from paper to electronic techniques should be fully explored.

We are pleased to note that our ocean services report and recommendations are being used by the National Ocean Survey in its current formulation of plans and objectives, both immediate and future.

On ocean mining: NACOA is in the final stages of drafting a report on long-term ocean goals and objectives for ocean mining. And as you have just noted, Mr. Keenan is chairman of that group.

Approval of the report and its recommendations is expected by this summer. It is probably premature for us to say anything about those recommendations at this time.

Ocean energy is another of the six topics NACOA has chosen for long-range goals and objectives study. But we have deferred this project for budgetary reasons. NACOA, however, did comment on one source of ocean energy, OTEC, in a May 1981 letter to the President. We said, in effect, that if OTEC is eventually as successful as proponents claim, private industry will develop it. However, we were concerned that continued Federal stimulus and endorsement may be needed before that point is reached.

We urged a careful review of the decisions to eliminate OTEC funding to insure that the hard-earned momentum for this program is not lost before private industry is prepared to step in.

On ocean dumping and the Marine Protection, Research and Sanctuaries Act, Mr. Chairman, NACOA spent considerable time reviewing ocean dumping issues. After some 18 months of study, we published a special report to the President and Congress in January of last year, entitled "The Role of the Ocean in a Waste Management Strategy."

This Nation produces about 1.5 billion tons of waste annually. And it is becoming impossible to find an acceptable site anywhere for some of these wastes. Our concern has been that the growing political and economic pressures associated with land disposal and incineration might create a backlash, forcing renewed pressure for ocean dumping, while research on the effects was being eliminated.

As we look at the significant events of the past year, we do see increased pressure to renew ocean dumping. Judge Sofaer's court decision has reopened the ocean dumping issue. EPA is drafting new regulations, and a half dozen municipalities are planning to submit applications for ocean dumping permits.

At the same time, EPA and NOAA programs planned for fiscal year 1983 seem inadequate to handle this renewed activity. EPA's management and research resources for ocean disposal work are level funded. NOAA's budget for supporting ocean disposal research is cut by 60 percent.

I feel strongly, Mr. Chairman, that if this Nation is to dispose of more of its wastes in the ocean, NOAA's research and monitoring budget must increase, not be reduced.

NACOA views the problems of waste generation, management, and disposal to be among the most serious for our society. We have just initiated a long-term review of the issues related to the marine disposal of radioactive wastes. And let me note immediately that undertaking of this review should not be taken as a recommendation for such disposal.

Ocean data and research collection: As part of our analysis of the President's proposed budget for fiscal year 1982, we commented on two ocean data collection problems. We believe that synoptic measurements provided by satellites can lead to revolutionary advances in our understanding of global ocean processes.

The decision to eliminate NOSS, the National Ocean Satellite System, has resulted in a significant loss of momentum, and NACOA urges that the appropriate sensors for ocean use be incorporated in existing and planned satellite systems.

With respect to the ocean research fleet: Equally important is the issue of research ships. For the past several years, our ocean research fleet has been shrinking, primarily because of fuel costs and increases in the effects of inflation on overall ocean science resources.

In spite of several studies over the past decade, there is little agreement on how many ships are actually needed. This seems to be a function not of research demand but of budgets. And even this is difficult to prove, since scientists, knowing what is in the wind, often do not propose projects which would require ship time.

Nevertheless, the United States, as a major seapower in the broadest sense, is seeing an ocean expertise which is becoming increasingly laboratory bound. We need to go to sea to understand the sea. The trend in ship support needs to be reversed.

On coastal zone management: In the past year we have testified at congressional hearings in support of coastal barriers legislation and OCS revenue-sharing. And last week we sent a letter to the Presidential Task Force on Regulatory Relief with recommendations for streamlining the administrative processes of the Clean Water Act's section 404 program.

We have made several comments recently concerning the Federal role in coastal zone management. We recommend a slower Federal phase-out of the CZM program. Our support for OCS revenue-sharing is predicated upon some of the revenue being earmarked for programs such as coastal zone management.

On Sea Grant: NACOA believes that the national infrastructure provided by Sea Grant for understanding and developing ocean resources is of importance to the Nation. Sea Grant was designed as a continuing partnership among the Federal Government, States, universities, and local interests, with each paying a share of the cost. It is not a program in which the Federal role would phase out. And we urge continued support for Sea Grant at the Federal level.

In addition to the issues which you have asked us to address, NACOA has been involved in many other activiites during the year. These are outlined in the formal testimony, but let me just list them for you.

The global positioning system, atmospheric research facilities, scientific diving regulations, hydrology and flood forecasting services, fisheries goals and objectives for the 1980's, marine transportation goals and objectives for the 1980's, ocean services for the Nation, weather services for the Nation, and the role of the Coast Guard.

Finally, I would like to make a few comments on NACOA reauthorization. In today's times of economic uncertainty, we are seeing major program changes, indeed a major rethinking of the Federal role in many of these activities. Choices will be harder, and the need for broad oversight will be greater.

NACOA stands outside of divided congressional jurisdictions and divided Federal responsibilities, and we try to represent Federal, State, and local interests. We feel strongly that an independent advisory body such as NACOA is even more important for the coming decade than it was when it was formed 10 years ago. And we respectfully request your support for NACOA reauthorization.

An important consideration in our reauthorization is adequate funding. Last year's legislation reduced our funding ceiling from $600,000 to $555,000. NACOA's members are pleased with the administration's support for multiyear reauthorization. There would, however, be very difficult choices to be made if our budget were reduced to the administration's proposed level of $461,000.

Our members earnestly believe that frequent meetings of the committee are essential to its continued effectiveness. We also believe that capable staff support across the spectrum of oceanic and atmospheric issues is equally essential.

Mr. Chairman, we consider the budget level recommended for fiscal year 1983 to be inadequate. We believe that the level required is $630,000, or about $680,000 if members are to have the GS–18 compensation rate allowed by the act.

Thank you, Mr. Chairman. We will try to answer any questions you have.

Senator SCHMITT. Thank you, Doctor.

I will yield now to Senator Long, who wished to direct some comments.

Senator LONG. I would just like to address some questions to Mr. Keenan, who is one of my constituents.

Mr. Keenan, what are your credentials for serving on the committee?

Mr. KEENAN. I am chairman and chief executive officer of an offshore service company. We operate a fleet of oilfield work boats and helicopters throughout the world, 110 work boats and 170 helicopters. We earn our living by flying in the atmosphere and operating on the ocean. So that is my interest.

Senator LONG. What do you see as the most important roles for this committee on which you serve?

Mr. **Keenan**. I think the most important role that we as a committee provide is that we establish a forum to address problems that normally may not be addressed by others. I think that we have a balanced group of individuals who serve because they want to serve and are not motivated to preserving their own self-interest. Therefore we can address problems and objectively discuss them.

Probably the greatest single factor in our relevance is that we can try and anticipate what impact congressional actions may have on the future of our oceans.

Senator **Long**. What would be the impact of the proposed level of funding that the President has recommended, the administration has recommended?

Mr. **Keenan**. Senator, we have a very competent group of individuals at NACOA, and a very competent staff made up of people with very capable backgrounds. My fear is that if we do not have the adequate staff to assist the members, we simply are not going to be able to function effectively. And as a result, the work that we do and the questions that we address will not be addressed in the proper fashion. If we are underfunded, and as a result, do not do quality work, I do not think we should be in a position to do any work at all.

Senator **Long**. How much of this money is paid as salary to you and to others who serve on the committee?

Mr. **Keenan**. Well, the present deal is that I get $100 a day for putting my time in.

Senator **Long**. And that time, you have to take away from your regular business?

Mr. **Keenan**. Yes. I spend, away from my business, in excess of 50 days a year.

Senator **Long**. Could you just give me some indication as to how that compensation compares to what you make when you are working in your business, what your business pays you?

Mr. **Keenan**. My business, pays me about $195,000 a year. And that is for 365 days, I suppose. And I guess for 50 NACOA days I get $5,000. But I do it because I want to.

Senator **Long**. All right. Now, what do you think an adequate level of funding would be for this operation?

Mr. **Keenan**. Dr. Knauss has testified that adequate funding was in the neighborhood of $685,000. I am a businessman, and I think I have a little better perspective as to how some of these things work than maybe some other people. I think that a level of $725,000 to $750,000 would be sufficient.

The organization is actively running very scared. There are lots of things that they do not do. There are lots of investigations that they do not take on. And as a result, I think that they have been very, very cautious almost to the point of being pennywise in trying to anticipate what their needs are.

I know that if I were running my corporation with the responsibilities that not only the staff but this panel has, I would think that they should have enough funds to adequately function in terms of the magnitude of the issues that they address. And I would say that $725,000 to $750,000 would certainly do it.

Senator **Long**. Does the committee serve to reduce litigation and delay in the domestic energy production?

Mr. **Keenan**. I cannot help but feel that it does, and maybe I can draw something from my own experience with NACOA. I was appointed by NACOA as a liaison to a study that is currently going on with the National Academy of Science involving the discharge of marine cuttings and drilling muds in the oceans.

I have particular interest in this, as an example. All you have to do is to hold up one lease sale or even 1 day's drilling or 1 day's production from these new areas, and the results can adequately be seen. So that anything that we can do as a group to anticipate what the problems will be, to investigate them, to bring the subjects up, and to prevent them from getting into the courts so that the people can say that the problem has been researched, is a service that is absolutely paramount in our search for energy.

Senator **Long**. Thank you very much, sir.

Do you care to elaborate on any of those answers, Dr. Knauss?

Dr. **Knauss**. No, sir, I think that Mr. Keenan has done a very excellent job of explaining why we think NACOA is important.

Senator **Long**. Thank you very much, Mr. Chairman. I appreciate very much that consideration. I will stay here as long as I can.

Senator **Schmitt**. Very well. Thank you, Senator.

Dr. Knauss, do you think there is any basis to worry that NACOA is uncritical of various proposals made for activities related to the oceans and that everything it proposed would be good to do and that we ought to fund everything?

Dr. **Knauss**. I like to think that the answer to that is no, sir.

Senator **Schmitt**. You are not a captive of the oceans industries, the oceans interests?

Dr. **Knauss**. No. I am an oceanographer. I have spent a large part of my life going to sea on ships. So I am an advocate for oceans, and I admit that.

The members of NACOA are well chosen, not only with respect to geography but also with respect to the various constituencies that they represent. And I think that, on coastal zone issues, to give an example, we do indeed have people who represent industry as well as the environment.

When we come down on a position with respect to a coastal zone issue, we like to think we have worked out a sort of microstructure, if you will, some of the kinds of debates that one sees in the public. And we like to think that when we have a position in NACOA on a given issue, we have thought through and looked at the various constituencies.

And we have not always come forward and said "more of this and more of that." We have tried very hard in the last few years to be concerned about that kind of a problem.

Senator **Schmitt**. Can you give me an example of a proposal that had significant surficial interest that the group decided it had no technical or economic merit?

Dr **Knauss**. Well, with respect to, coastal zone management and OTEC, both in which the President suggested be brought down to zero, there were many advocates who thought that the programs should be continued at a very high rate.

We took a middle position, both with respect to OTEC and coastal zone management. We expect coastal zone management to be phased out. The only issue we raised was that one cannot expect States, coastal States, to take on suddenly without any forewarning the entire cost of a coastal zone management program for which they did not have any opportunity for planning or discussion.

And so we commented not that it should not go to zero, but rather on the rate at which it goes to zero. That is one example.

Senator SCHMITT. And with respect to OTEC?

Dr. KNAUSS. On OTEC we said the same thing. That is, that our concern was not whether the Federal Government should continue to support OTEC through various pilot models and these kinds of things. Rather, we commented on the rate at which it should go to zero, whether it should be like any business once you have made an investment. We were concerned that nobody had looked closely enough at the rate at which they were going to reduce the expenditures in OTEC.

Senator SCHMITT. Did the group do a fairly extensive economic analysis of the feasibility of OTEC?

Dr. KNAUSS. No, sir. We did more with respect to coastal zone management than with OTEC.

Senator SCHMITT. Was there any concern expressed that in order to determine economic feasibility a major capital investment would have to be made because of the low theoretical efficiency of such a system?

Dr. KNAUSS. I know about the low theoretical efficiency of the system. We were, however, also impressed that certain foreign countries, particularly Japan, were making the decisions to go forward with that fairly large capital investment. We were not suggesting that the Government should subsidize that entire effort. But it seemed to us that there were still some technical problems that needed to be worked out in order to give private industry some opportunities to make their own decisions as to whether to go forward with the large capital investment.

Senator SCHMITT. Senator Gorton?

Senator GORTON. No questions.

Senator SCHMITT. Senator Long, did you have anything else?

Senator LONG. No.

Senator SCHMITT. Dr. Knauss, can you tell us where in your opinion the National Ocean Survey can be improved?

Dr. KNAUSS. Mr. Chairman, we have not looked at the National Ocean Survey per se. When we looked at the various ocean services to be provided to the Nation, we looked very quickly at a very wide variety of areas. I hesitate to suggest any more than what was said in our formal testimony with respect to these issues, because we have not looked at NOS.

Senator SCHMITT. Do you intend to examine that issue in the near future?

Dr. KNAUSS. What we take up, Mr. Chairman, is dependent upon three sources of input. One is from Congress. If we are specifically asked to look at something, we try our best to do so. If we are particularly asked by the administration, we try to look at those issues. We also generate a fair number of problem issues on our own. We have had no request either from Congress or the administration for NOS. In terms of developing our own agenda, we have not thought of NOS as very high priority.

Senator SCHMITT. What are the major differences in your group's recommendations for ocean dumping and the actual practice of ocean dumping by this country?

Dr. KNAUSS. The 1972 Ocean Dumping Act, which was amended in 1977, essentially said that this Nation should stop putting things in the ocean completely, with rare exceptions. For example, it is more difficult to put dredge spoils in the ocean than it is to put them in estuaries because of the laws and regulations. We suggested that because of the complex set of problems we have as to where to put waste materials, whether you incinerate it, whether you put it on land, whether you put it in estuaries and so forth, that it was time to look at this issue all over again, that we needed, if you will, a cross-media look. In other words, if you have the material, where is the best place, where is the least damaging place. You can only recycle so much, as you know. The second law of thermodynamics does come into play somewhere here.

Senator SCHMITT. Oh, come on.

Dr. KNAUSS. Well, you can spend as much energy as you want. That only increases the CO_2 problem. We did suggest that it was time to relook at the issue as to whether or not the ocean should be completely isolated, should be off bounds for ocean dumping. And we made strong recommendations that the oceans did have a certain assimilative capacity, that the oceans could be used for certain kinds of material. But we also said, and very strongly, that if one is going to go into the oceans for dumping, it was critical that one not only monitor what is happening, but that one also assess with various kinds of research programs what the consequences are. We have a concern which someone referred to as the fish do not vote attitude. It can be too easy in some sense to put things into the ocean. Out of sight, out of mind. And we are concerned about the long-term consequences of that.

Senator SCHMITT. Do you try to thoroughly evaluate alternatives, such as incineration for certain types of wastes, some of which have not normally been considered for incineration?

Dr. KNAUSS. We did not do that. But one of our strong recommendations to EPA was that they establish a program where they could make this cross-media analysis.

Senator SCHMITT. There is a fairly sophisticated incineration technology developing, not only in this country but in other parts of the world. The fluidized bed concept is considered to have contributed a great deal to it, but you would not look to your group to do that evaluation, and you would strongly recommend that it be done.

Dr. KNAUSS. Yes.

Senator SCHMITT. But in those areas where there will not be a very obvious alternative, you think that on a case-by-case basis the ocean should still be considered, but not indiscriminately considered?

Dr. KNAUSS. That is correct.

Senator SCHMITT. What do you think NOAA should be doing in this area?

Dr. **Knauss**. NOAA has had a program for looking at the long-term aspects of the consequences of both the dumping of industrial waste and sewage sludge, primarily industrial waste, I believe. Our concern is not so much what NOAA is doing, insofar as we have examined the program. What NOAA is doing, it is doing quite well. Our concern is that it would appear, at least, looking at the budget, that the NOAA research effort in this area is being cut, as we said in our testimony, by 60 percent this year.

It seems to me that this country is working at cross-purposes. EPA, on the one hand, is changing its regulations, or at least considering changing its regulations, to increase the amount of material that should go into the ocean. And, both EPA and NOAA, but particularly NOAA, are reducing research efforts in this field. We think that is working at cross-purposes.

Senator **Schmitt**. When you say research efforts, are you speaking of research efforts on the consequences of dumping?

Dr. **Knauss**. Yes. The long-term impacts.

Senator **Schmitt**. Short and long term?

Dr. **Knauss**. Yes. Some of the long-term impacts are going to be the most difficult to determine, and there can be very subtle effects.

Senator **Schmitt**. But also the inherent capacity of the ocean to absorb dumped materials increases with time. One only has to look and ask yourself the question, what happened to all the oil that went into the oceans in World War II.

Dr. **Knauss**. That is right. The ocean has a large assimilative capacity. It is the final sewer system of the world. Everything drains into the ocean at some point, and it does indeed have a large assimilative capacity. All we are talking about is the rate at which you are putting things in.

Senator **Schmitt**. The ocean can overwhelm its natural capacity.

Dr. **Knauss**. Yes, and although the ocean mixes on a time scale of 1,000 years, we are not talking about 1,000 years. We are talking about the impact in smaller areas over shorter time scales.

Senator **Schmitt**. Where that protective system, as I said, might be overwhelmed, by the rate of dumping.

Dr. **Knauss**. Yes.

Senator **Schmitt**. Do you think that in a general sense is where NOAA should be concentrating its research efforts in this area?

Dr. **Knauss**. Yes, sir. One thing is not quite clear to me. I have never quite understood the relative role of EPA and NOAA with respect to these problems, but there is a range of problems that need to be looked at. Maybe it is EPA's responsibility primarily to focus on the monitoring of dumped material, and NOAA's to do the long-term research. But one way or the other, all of those problems have to be addressed.

Senator **Schmitt**. Could you share with us the improvements your group would suggest for title II of the Marine Protection and Sanctuaries Act?

Dr. **Knauss**. Some of them are outlined in our testimony, the formal testimony that we put forward. There has been a suggestion that since user fees are one of the so-called new ideas in this city with respect to how one can get payment for things without raising taxation as such, that one could look at a variety of user fees for the question of what one would put in the ocean.

For example, New York City wants to continue to dump its sewage sludge at the 12-mile dump site. It is going to save them millions of dollars to do it that way rather than to find a land or incineration alternative. One suggestion has been, and we have made it also, that one could charge those who are going to use the ocean. There is a commons area, and one could argue that those who use that commons area should pay for the privilege.

Senator SCHMITT. What about the seabed mining effort?

Dr. KNAUSS. I think I would have to turn that one over to Mr. Keenan. As I said, we have a task force that is working on that. We have held a series of meetings. They have not reported to NACOA. We hope to have the report and recommendations out some time, and I do not know whether he is prepared to talk about that in public or not. That is up to him.

Mr. KEENAN. Specifically, sir——

Senator SCHMITT. Please, if you have any thoughts you feel that you can share with us now.

Mr. KEENAN. Maybe. I do not think I can speak for NACOA on this yet. As for my own thoughts, I think that at the present time the United States is embarking on a rather dramatic agreement. What we are really talking about is whether or not the United States is going to effectively be in a position to mine strategic metals which it needs for its future from the deep sea, or whether or not it is going to sign up to a minerals OPEC. I think this is something that you all are certainly going to consider. It will be sent to you.

We have held hearings, and are shortly going to prepare and issue a report. We have tried to assess the impact of the present and the future both from an economic from a political, and from just about every aspect that you can of denying access to the United States for these deep sea minerals, many of which we import, primarily, as an example, cobalt, from Zaire. We are very concerned about this situation. We think that it has not had the proper attention, and for the sake of being tied to the Third World, we may as a country give away an awful lot of our future. We may find ourselves ruing the day that we signed such a treaty if we do. Those things are not for me to determine. You are the ones who should approve that.

Senator SCHMITT. Is your task force looking at the indirect consequences of deep sea seabed mining on the minerals industries which do have a strong economic base in this country. By mining cobalt, you also develop significant new reserves of copper, as an example? Are you looking at the economic consequences and ways to mitigate those consequences?

Mr. KEENAN. You mean the consequences from an oversupply, sir?

Senator SCHMITT. Yes, sir.

Mr. KEENAN. I do not think it is appropriate for our panel. I had not really considered that we should try to assess what overcapacity would mean. We were really trying to look at it and see what effects would be from our country being placed in a position where we would become totally dependent on others for the continuing of those industries which rely on those strategic metals for their viability. So the answer to your question is no, sir.

Senator **Schmitt**. Is that not a fairly limited view, to look at cobalt, which I agree is in short supply? There may be other alternatives domestically on shore, but nevertheless cobalt and nickel and manganese are usually cited as the three on which we are most dependent on foreign imports, but in getting those three, you also produce a significant amount of copper.

Mr. **Keenan**. Yes, sir.

Senator **Schmitt**. It seems to me that in addition to looking at the positive side, you should be evaluating the negative side, not that that would necessarily stop and make you want to stop becoming independent of foreign sources of cobalt, manganese, and nickel, but that you figure out how in the world we are going to keep our domestic copper industry from going bellyup, as my friends would say, maybe in an unjustified way.

Mr. **Keenan**. I can comment. Certainly we are in the process of drafting our report, and we will certainly take that into consideration.

Senator **Schmitt**. I certainly hope you will, because there are a lot of people out there employed by a depressed copper industry and even now would be wondering what in the world this means to them in the long term.

Mr. **Keenan**. We appreciate your criticism and suggestions.

Senator **Schmitt**. Doctor, did you have a comment?

Dr. **Knauss**. There are two points I would like to make, one of which is that we are talking about a domestic mining industry which will be working in the deep oceans. So, it is the same industry, Kennecott Copper and others that will be out in the deep sea, as well as on land. I believe we are still importing copper, for example, Kennecott Copper in Chile. But I think we are importing copper as well as mining it within the United States.

Senator **Schmitt**. We do have a domestic capacity, if we were curtailed for copper, to produce what we need. There is a sufficient reserve base and a potential reserve base even without the offshore minerals, to supply our essential strategic copper needs, and what I am getting to is that I think it is a little bit shortsighted to just say yes, it is the same general industry, but when you look at the impact on specific areas of this country, Utah and New Mexico, Arizona, with the introduction of large supplies of byproduct copper from deep sea mining, that impact could be extraordinarily severe, and in the local sense could not be made up by the fact that you are dealing with the same general industry, so you do need to address that, I think. If nothing else, shrug your shoulders and say, nobody said it would be fair, but you have to realize that there will be a significant group of people around who say that it is not only unfair, but we have to do something to at least mitigate its impact over some period of time.

Dr. **Knauss**. The reason why there are going to be production quotas in this new treaty is because countries like Canada worry about their nickel resource. And countries like Zaire are worried about their cobalt resource, and so forth. That is one of the issues that has been under negotiation in the Law of the Sea Treaty for the better part of 10 years.

Senator **Schmitt**. Senator Gorton?

Senator **Gorton**. No questions.

Senator **Schmitt**. Thank you.

[The statement follows:]

Statement of Dr. John A. Knauss, Chairman, National Advisory Committee on Oceans and Atmosphere

Mr. Chairman, it gives me great pleasure to appear before this Committee to discuss NACOA's activities and to request your support for its reauthorization.

The past year, 1981, marked the end of NACOA's first decade of service and advice to the Congress and to the President. It was also one of NACOA's most active years. Our membership was up to 17 for most of the year and was a major factor in our productivity. You will recall that in the latter part of 1979, NACOA was down to 8 members at one point, and in 1980 there were no more than 13 appointed members until October. We started this year with 17 members, and, only last month, the President appointed our 18th member for a full roster. With the amendment that your Committee endorsed in our 1981 legislation for retention of members until replaced, we expect a high level of activity and participation in the future.

During 1981, there were 9 meetings of the full Committee and 16 additional intersessional panel meetings. Several members had the privilege of appearing before committees of the Congress to present NACOA's views and recommendations on important considerations such as waste management and ocean dumping, oil spill liability and compensation, coastal barriers, and OCS revenue sharing. We provided the Administration with our views on the NAVSTAR Global Positioning System, noting the significance to the civilian community of this major navigational advance by the Defense Department and the need to ensure adequate consideration of the non-military user community in the design and planning process; we examined the adequacy of atmospheric science research facilities and sent to the President's Science Advisor our recommendations on needed Federal investments in development and procurement to meet civilian and military requirements for atmospheric observations and for weather and climate forecasts.

OCEAN SERVICES

The NACOA report, "Ocean Services for the Nation," initiated our review of the long-term value of the oceans to the United States. We formulated our views of ocean activities that could be expected over the next decade and beyond, and our recommendations for ocean services required to support and bring contributions from those activities to bear on national needs more efficiently and effectively. We saw as main driving forces energy, fisheries, growth of the coastal zone population, and other or "new" uses of the ocean made possible by science and technology, such as waste disposal, marine mineral mining, and renewable energy sources (OTEC, for example).

Our recommendations were directed to a number of agencies, including NOAA's National Ocean Survey. In mapping and charting, we recommended that the criteria for redoing "old surveys" just because they are "old" be reexamined in order to preclude automatic resurvey, that only areas with proven inaccuracy to the degree that they represent dangers to navigation be targeted. Our aim is to make more ship time available for higher priority needs—such as hydrographic surveys of unsurveyed areas of considerable importance, as in the Arctic, or bathymetric surveys needed by the U.S. Geological Survey on the continental shelf. We also recommended exploring the feasibility of transforming mapping and charting practices from paper to the electronic age. We believe that the application of the electronic revolution to traditional modes of maps and chart preparation warrants intensive exploration. We are pleased to note that our "Ocean Services" report is being used as a principal document by the National Ocean Survey in its current formulation of immediate and long-range plans.

OCEAN DUMPING

NACOA has spent considerable time reviewing waste management issues, particularly those relating to ocean dumping. This Nation produces about one and a half billion tons of waste annually, and it is becoming impossible to find an acceptable site anywhere for some of those wastes. Our concern has been that the growing political and economic pressures associated with land disposal and incineration (and implementation of RCRA regulations) might create a backlash forcing renewed pressure for ocean dumping, while research on the effects was being eliminated.

In our report "The Role of the Oceans in a Waste Management Strategy," we recommend: Increased incentives for reuse, recycling, and reduction of waste products; An integrated approach to weighing different waste disposal options; More consistent environmental criteria for disposal in different media; Continuation of ocean disposal "under appropriate management conditions and with adequate monitoring safeguards."; Increased emphasis on ocean disposal research and monitoring.

As we look at significant events of the past year, we do see increased pressure to renew ocean dumping. Judge Sofaer's court decision has reopened the ocean dumping issue; EPA is drafting new regulations, and several municipalities are planning to submit applications for ocean dumping permits.

At the same time, EPA and NOAA programs planned for fiscal year 1983 seem inadequate to handle this renewed activity. EPA's management and research work for ocean disposal work are level funded; NOAA's budget for supporting ocean disposal research is cut by 60 percent. If this Nation is to dispose of more of its waste in the ocean, NOAA's research and monitoring budget must increase—not be reduced.

NACOA continues to believe that ocean dumping should be a waste disposal option, but this option must be carefully weighed and considered against landbased and incineration alternatives. But, because ocean disposal may well be a politically and economically easy choice in the face of growing land disposal problems, we must guard against indiscriminate dumping. Carefully designed monitoring programs are essential so that we can be alerted to any unexpected negative impacts; a solid basic research effort must be in place so that we can assess waste disposal effects. NACOA believes that EPA and NOAA funding plans for ocean disposal management and research programs fall short of meeting these needs.

With respect to the Marine Protection, Research and Sanctuaries Act, (MPRSA) it is our view that it does not provide clear direction for regulation of ocean dumping. We would support improvements providing for consideration of prudent and feasible alternatives prior to ocean dumping, for emphasizing reuse and recycling, for careful site designation, for expressing the need for research and monitoring, and, if adequate Federal funds cannot be provided for research and monitoring, provisions for some form of user fees.

Our Nation is in transition from moving toward the elimination of all ocean dumping to recognizing that the ocean is one option in a multi-media approach. During this transition, responsible departments and agencies, such as EPA, the Corps of Engineers, and NOAA, should be given the latitude to develop the scientific and regulatory framework that adjusts to this new concept, a very difficult problem in waste management.

NACOA views as promising certain efforts in the Administration. NOAA is conducting a series of symposia this year to define "unreasonable degradation." EPA is undertaking a comprehensive multi-media sludge management project, and is consolidating its marine resources programs as part of this project. The results of these efforts could contribute to the clarity presently lacking in the MPRSA.

Mr. Chairman, NACOA is continuing its work in this important area. We view the problems of waste generation, management, and disposal to be among the most serious for our society. We have just initiated a long-term review of the issues related to the marine disposal of radioactive wastes. I must state that the undertaking of this review should not be taken as a recommendation for such disposal. We do note, however, that there are pressures or suggestions to do so, as in the studies of the Nuclear Energy Agency assessing subseabed disposal, the DOE evaluation of offshore possibilities for disposal of materials previously placed at land sites such as Middlesex, New Jersey, and the Navy's review of options for disposing aged nuclear submarines. It is our intention to examine the techniques which have been proposed, current research activity, as well as the state of knowledge respecting the impacts and consequences.

We have begun 1982 with an equally diverse, full, and active calendar. We are examining selected regulations affecting offshore activity. Recently we sent to the Vice President, as Chairman of the Presidential Task Force on Regulatory Relief, our recommendations concerning relief of divers engaged in scientific research from commerical diving regulations. We noted that clearly, some standards should be available for the scientific community to ensure safety of operations. However, we pointed out that scientific divers, through their research institutions and through their professional organizations, have strived to provide safety in research diving. Research divers have adopted and amended their own standards over nearly three decades, and the documented safety record of this community indicates that such self-regulation is effective. We recommended that OSHA declare definitively that this type of diving is exempt from the commerical standard.

Last week we completed our review of Section 404 of the Clean Water Act and sent NACOA's views to the Task Force. We concluded that changes in existing administrative procedures of policies governing section 404, and perhaps even legislative change, are warranted.

In summary, we recommend that:

An improved and more precise definition of wetland subject to Section 404 is needed. The definition presently used appears to be, under certain circumstances, ambiguous and vulnerable to arbitrary interpretation.

If an improved definition of wetlands is developed with the consensus of the relevant agencies, then the present administrative bifurcation of the approval process at the Washington, D.C. level is no longer needed. The ultimate decisionmaking authority on the jurisdictional limit of the Section 404 program should be transferred from the Environmental Protection Agency to the Assistant Secretary of the Army for Civil Works.

There should be fewer potential levels of regulatory review in the permit-procesesing hierarchy. As presently structured, a controversial application can be elevated to higher authority no less than five times. We believe two levels are sufficient.

The U.S. Army Corps of Engineers should provide faster response time at each level of review.

Permit application processes should be simplified to reduce unnecessary burden upon the applicant.

To the maximum extent possible, incentives should be provided, and disincentives eliminated, to encourage State governments to assume responsibility for the administration of the Section 404 program.

Additionally, before mid-year, we expect to complete and issue our comments and recommendations on NOAA's Hydrologic Service and its flood forecasting. We expect also to complete three additional reports of our long-term National Ocean Goals and Objectives, those on Marine Fisheries, Marine Transportation, and Marine Mineral Mining. We will also complete by the summer our report summarizing our views on the weather services provided to the public and the role of the private sector in this area.

I believe one of the most important efforts of NACOA last year was our extensive review of the President's program and the impact of economic measures on the Nation's oceanic and atmospheric programs. We found that atmospheric programs were generally well supported. On the other hand, we had serious concern regarding the oceans. We wrote to the President that, in our view, actions were being taken piecemeal without adequate regard for the interdependence of many ocean programs.

In developing our views, we met with representatives of the Federal agencies and offices responsible for the conduct of ocean programs. We developed, at least in our opinion, a unique sense of the cumulative effect of budget actions on the overall Federal effort. From this broad perspective, we sent our advice to the President and Congress on several areas. Of interest to your Committee, Mr. Chairman, are our concerns for a number of significant ocean issues.

SEA GRANT

With respect to this unique and generally underestimated program, it is NACOA's view that the national infrastructure provided by Sea Grant to understand and develop ocean resources is of considerable importance to our country. There is significant national interest here that requires continued Federal involvement. The scientific development, technology transfer, and trained manpower emanating from the Sea Grant College program have been impressive. Sea Grant was designed as a continuing partnership among the Federal Government, State, universities, and local interests with each paying a share of the costs, not as a program in which the Federal role would phase-out. We urge its continuing support.

COASTAL ZONE MANAGEMENT

NACOA is of the opinion that the only program that provides the uniformity needed for effective preservation of our coastal areas is the Coastal Zone Management (CZM) program. Only through CZM is the national importance of this boundary environment recognized. The program was designed to be gradually phased out as coastal States developed their coastal zone management programs and took responsibility for implementation. For a number of reasons, many States were slow in developing their programs. The disruption caused by abrupt cut-off of Federal support is not, in our view, in the national interest. Just as the Federal Government requires a long lead time to plan and fund new efforts, the States likewise require lead time to assume new responsibilities.

NACOA recommends a slower Federal phase-out to provide for reasonable assumption of burden by the affected States.

I mentioned earlier, Mr. Chairman, that we had addressed ourselves to OCS revenue sharing. Our support for OCS revenue sharing for coastal States was predicated on such revenues being a reasonable source of continuing and needed Federal support for important coastal and marine programs of national interest and perspective, such as Coastal Zone Management and Sea Grant.

The encouragement of technology to develop ocean resources use is needed from the Federal Government. Two such areas are at a critical stage in their development.

OCEAN OBSERVATION FROM SATELLITES

The decision to eliminate NOSS has resulted in a significant loss of momentum in our ability to monitor and understand global oceanic processes that affect our lives. There are many scientists who are convinced that satellite observations of ocean phenomena will lead to revolutionary changes in our understanding of physical and biological ocean processes, which can lead to major advances in the way we deal with weather, climate, and ocean productivity. Bringing this revolution to fruition will require global synoptic measurements which only satellites can provide. At present there is no civilian program initiative which leads to this capability.

RENEWABLE ENERGY SOURCES FROM THE OCEAN

Ocean thermal gradients for energy conversion appears to NACOA to be one of the most promising of this Nation's renewable resources. If OTEC is eventually as successful as its proponents claim, private industry will develop it. However, NACOA is concerned that continued Federal stimulus and endorsement may be needed before that point is reached. We urge a careful review of the decision to eliminate OTEC funding to ensure that the hard-earned momentum for this program is not lost before private industry is prepared to step in.

Our review of the Administration's program has led NACOA to express its concern in two additional areas.

U.S. COAST GUARD

It is our view that there is a significant mismatch between the civilian responsibilities that have been heaped on this valuable ocean operating force and the resources that have been allocated to it. The success of many of our national policies, such as fisheries management and conservation, oil spill response, and safety at sea, for example, are dependent on a reliable and capable U.S. Coast Guard. Yet, year after year, its ability to perform an increasing array of mandated functions is degraded because of inadequate resources.

If adequate resources cannot be provided, NACOA recommends the suspension of some activities in order that those of highest priority and uniquely provided by the U.S. Coast Guard be effectively conducted. We are aware that there have been a number of studies on the mission/resource balance of the U.S. Coast Guard, including user fees, by the Department of Transportation and OMB, and by the House of Representatives Committee on Merchant Marine and Fisheries.

We have recently established a panel to look into U.S. Coast Guard roles and missions versus resources. We have heard from the Coast Guard on the OMB/Department of Transportation study. Our panel has available also the Congressional Research Service study on the U.S. Coast Guard prepared at the request of Senator Packwood. I don't know yet how our review will come out, but our initial objective is to seek a logical presentation of mission priorities which can be of assistance to those wrestling with this difficult issue, that of ensuring a proper balance of resource and responsibility for the important services provided by the U.S. Coast Guard.

OCEAN RESEARCH FLEET

It is NACOA's view that, in the long-term national interest, it is essential that we understand ocean processes and the factors that are relevant to resource availability and productivity. My earlier comments on remote sensing from satellites bear on this. Equally important is the issue of research ships. We must go to sea to understand the oceans. For the past several years, our ocean research fleet has been shrinking, primarily because of fuel cost increases and the effects of inflation on overall ocean science budgets. In 1973, the federally supported fleet at major oceanographic institutions numbered 34. The resources available project a fleet of 25 in fiscal year 1982. There are additional reductions which can be expected in fiscal year 1982 as increases in operating costs affect days at sea by institutional vessels and from the proposed reduction of two more NOAA research vessels. In spite of numerous comprehensive studies over the past decade, no one knows how many research ships are actually needed. It seems to be a function, not of research demand, but of budgets. Even this is difficult to prove since scientists, knowing what's in the wind, often do not propose projects which would require ship time. Nevertheless, the U.S., as a major sea power in the broadest sense, is seeing an ocean expertise which is becoming increasingly land and laboratory bound. We need to go to sea to know the sea. The trend in ship support needs to be reversed and at least stabilized.

NACOA REAUTHORIZATION

NACOA remains of the opinion that the Nation's ocean assets continue to be inadequately ecognized in addressing critical national issues; that the institutional advances made during the past several decades toward looking at the oceans as a whole in the public interest are being eroded because of pressing economic problems; that there seems to be a lower than usual priority accorded the oceans in developing the long-term strategies for the economic health and security of the Nation.

I bring this up, Mr. Chairman, not without appreciation of the very difficult task confronting the President and the Congress in making choices under present economic conditions. Within all this activity to structure reasonable current budgets, it seems to me that we must not lose sight of our future needs and opportunities. My purpose here, Mr. Chairman, is to state, with respect to oceans and atmosphere, that under today's conditions where cutbacks are being made based on economic criteria, with little consideration possible on the interrelationships among policy and program areas, NACOA—as an advisory body providing a continuity of view, maintaining a long-term perspective while examining issues of current import, and keeping an eye on future potential and opportunity—as in our National Ocean Goals and Objectives Program—will be more important in the coming decades than it was 10 years ago when born into a more affluent economic situation.

With the political and interest mix on our committee, with the high competence in many areas represented by our membership, our advocacy is for national interest and not parochial. We attempt to ensure that the benefits of the oceans and atmosphere are adequately considered in our national strategies, including Federal budgets, and that these strategies are as coherent as is possible. It requires a comprehensive view of the interplay of all activities and policies concerning them. It is our view that the concept of NACOA, bringing together a group in which all activities continue to be integrated over time, was right at the time of its conception in the Stratton Commission report. It has been demonstrably effective during its first decade as the United States increasingly recognized the value of its oceanic and atmospheric domains. Considering the current economic situation and the apparent framework of budget actions in both current operations and support for future developments and benefits, much of it seemingly instituted without adequate consideration of mutual effects among programs, it is our view, and we believe it should be yours also, the NAOCA is more important than at any time before. Your support for reauthorization for NACOA is respectfully requested.

With respect to reauthorization, Mr. Chairman, an important consideration is adequate funding. Last year's legislation reduced our funding ceiling from $600K in fiscal year 1981 to $555K in fiscal year 1982. The effect of the fiscal year 1982 action was to preclude a reasonable plan of activity beyond the one authorized year, and, required the following adjustments in order to continue the work of NACOA at the reduced funding level: The number of meetings was reduced from 9 to 8; Members voluntarily agreed to hold their compensation at $100 per day instead of raising it to the GS-18 level authorized by the Act; RIF action was instituted for one senior professional staff member, reducing to 9 the number of authorized full-time staff positions; One secretarial staff hiring was deferred and remains so; National Ocean Goals and Objectives projects for energy and for waste management were deferred.

Although the above adjustments may not seem to be serious, it must be noted that this shows an erosion from 11 meetings and 11 permanent staff only a few years ago.

The Committee provides an important public advice and oversight function as mandated by Congress. We hope you are of the same view. It is important, therefore, particularly in these times, for assuring the continued and efficient operation of the Committee—both as to member participation through meetings and in Administration and Congressional forums, and as to staff capability. Both are equally important.

I have examined the requirements of NACOA. I believe we can maintain an efficient operation and effective performance with the current level of activity—8 meetings per year plus a reasonable number of intersessional and other activities, such as participation in Congressional hearings—and the present staff level of 9. But we need to support these in a manner to provide flexibility to accommodate mandated increases, such as salaries; merit awards; inflationary pressures in travel; and other member expenses, without serious effect on operations.

I believe that the budget recommended for fiscal year 1983 is inadequate. Rather, I believe that a level to support NACOA to properly perform its functions in support of Congress and the Administration is $630,000 for fiscal year 1983. This assumes continued member compensation at $100 per day and an increased average attendance resulting from changes to the legislation I mentioned earlier regarding termination of appointments. At the GS-18 compensation rate allowed in our legislation, the sum requird would be about $680,000.

There would be some difficult choices to be made if our budget were reduced to $461,000. Our members believe earnestly that frequent meetings of the Committee as in the past are essential to its continued productivity, effectiveness, and influence. They also believe that capable staff support across the spectrum of oceanic and atmospheric issues is equally essential. Staff support is a major portion of our budget, projected in fiscal year 1983 at about $390,000 for the reduced staff level with an estimated 5 percent salary increase included. Member compensation and travel would amount to about $160,000 for the fiscal year 1982 level of activity. The average expense for each regularly scheduled NACOA meeting, other than staff, is about $16,500. Clearly a reduction of another $90,000 would have its greatest impact on the level and quality of staff support, but it would also impact the entire NACOA operation.

Mr. Chairman, the NACOA members are pleased with the support of the Administration for a multi-year authorization. I must repeat, however, that we consider the budget level inadequate. I hope the information that I have provided in this statement will be useful to your deliberations and decisions.

Senator SCHMITT. If we may, we will take Dr. Taylor's testimony next. Dr. Taylor, if you are here, Dr. Sarah J. Taylor of the Coastal States Organization of Hartford, Conn. Dr. Taylor, if you would summarize your testimony, please, and then we will have a few questions for you.

STATEMENT OF SARAH J. TAYLOR, COASTAL STATES ORGANIZATION

Ms. TAYLOR. Thank you very much.

My name is Dr. Sarah Taylor. I am representing Mr. Art Rocque, and also the Coastal States Organization, which is an alliance of the 27 coastal States, 3 commonwealths, and 5 territories that provide an effective voice in the formulation, development, and implementation of national marine and coastal resource programs and policies. Due to the fact that our organization is coastal based, I will be focusing your attention upon two issues, the first one being the future of the coastal zone management program, and the second one being the trend of NOAA reorganization to an ocean service division. I have just a few points to make under the future of the coastal zone management program.

The Coastal States Organization asks for your encouragement and support of restoring funding for this coming year under the Federal Coastal Zone Management Act, which was reauthorized in 1980 by Congress. This act was an all-encompassing one. It was reauthorized for 5 years, and was done so after extensive hearings and public debate. Under this act, the organization is willing to cope with different levels of funding and has done so by taking a phasedown stance in dealing with the administration's budget cuts. However, the organization believes that the act should remain intact even with the limited funding and that its intent should not be changed.

This last year, due to budgetary considerations, the Coastal States Organization agreed that a reduction in funding would need to be made, and in taking this stance, understood at that time that the $33 million of section 306 funds and the $7 million of coastal energy impact program funds would indeed be representative of this reduction position. The rescission before Congress of removing all $7 million from the coastal energy impact program and $12 million from Section 306 funding does not support the phasedown philosophy agreed to, but instead fosters the lack of commitment by the administration to an efficient management of the Nation's coastal resources.

In addition, it places the States again in the precarious position of not being able to assume the funding gap created by the Federal level.

The second point, the Coastal States Organization asks for your support of supplemental 306 funding for New York and New Hampshire, and there is a source of funding that could be used which would not detract from the phasedown philosophy fostered by the administration. In fiscal year 1983, there will be approximately $16 million paid back into the coastal energy impact program loan fund. These loan proceeds are being transferred out of Coastal Zone Management Act functions, and are being absorbed by other programs within NOAA.

The Coastal Organization asks for your support in diverting approximately $4 million of these funds to be used by New Hampshire and New York, who have just really been able to get their programs approved.

The third point, the Coastal States Organization asks for your support of legislation that encourages the concept of Outer Continental Shelf revenue sharing for funding State coastal zone management activities, the sea-grant program and State programs that were once funded fully under Federal fisheries assistance. This would reverse the lack of commitment currently taken by the administration, and would strengthen the funding basis from a year to year appropriation to one of a more consistent nature that States need in order to manage their resources.

Recent surveys show that without an alternative to current funding schemes, between 60 and 80 percent of States staffs will be lost, and this includes staff that are responsible for carrying out existing statutory review for OCS activities. This places States in a bind, because not only are the Interior Department's activities under the 5-year leasing schedule being accelerated, but also national legislation dictates that State coastal management programs should play a role in this development.

Moreover, while States may receive some potential benefits from OCS activities, they also clearly will receive some adverse environmental safety and growth consequences at a time when virtually all Federal financial assistance to support the vital research, coastal management, and impact mitigation is being eliminated. Not only are the coastal zone management programs important, but the sea-grant programs and the State fisheries programs are all important beneficiaries of this potential source of legislation and funding.

The sea-grant program, whose function has been to provide supplemental research and technical data analyses to the States as well as other entities needs to be supported. Without their effort, environmental and data base analyses upon which management decisions are made would be lost. Our coastal fisheries are no longer State resources. They are being viewed as regional resources and international resources as well. Without the ability to conduct species surveys, or the ability to properly manage these resources, which efforts have been funded by Federal fisheries assistance programs, our fisheries may become a depleted resource, subject to the varied demands placed upon them.

In other words, all three programs and efforts are needed. They are not duplicative, and each one serves a separate constituency. All three efforts have been supported in the past by Congress, and all three use professional practitioners to deal within the respective areas of interest, the coastal area.

The second issue I wish to make light mention of to you is the organization trend toward ocean issues within NOAA. The Coastal States Organization asks for your close examination of this trend, because it appears to us as if coastal issues will no longer be addressed and ocean issues will move to the forefront. As an example, how will NOAA be able to state that this trend will lead to more relevant research, more useful services, and better management of coastal resources when the activities are taking on an ocean focus and when, for example, the Great Lakes States are not even ocean related, nor do they concern themselves with marine operations, ocean engineering, and technology development, which are the suggested supporting activities of this reorganization.

To close, there is a simple law of ecology that states, "Everything is connected to everything else." Coastal areas and ocean areas do impact upon one another. A balance of emphasis on development, conservation, and preservation needs to be maintained, both from a coastal perspective and ocean perspective. Concentration upon one area at the expense of another will cause an imbalance, and that goes against the intent of the Federal Coastal Zone Management Act and the Outer Continental Shelf Lands Act Amendments, which stressed that the interface upon which we should concentrate is that interface between land and water. It has taken us so long to get a bit of legislation that has combined land activities and uses and water activities and uses together. Let us not lose that quantum leap that we as a nation and the U.S. Congress had the foresight in seeing and removing our focusing from the coastal land and water interface.

Thank you very much.

[The statement follows.]

STATEMENT OF THE COASTAL STATES ORGANIZATION

Mr. Chairman and members of the Committees, my name is Dr. Sarah J. Taylor and I am representing the Coastal States Organization which is an alliance of the 27 coastal states, 3 commonwealths and 5 territories that provide an effective voice in the formulation, development and implementation of national marine and coastal resource programs and policies. Due to the fact that our organization is coastal based, I will be focusing your attention mainly upon two issues: (1) the future of Coastal Zone Management, and (2) the trend of NOAA reorganization to an Ocean Service Division. First of all, I wish to address the future of the Coastal Zone Program.

1. The Coastal States Organization asks for your encouragement and support of restoring funding for this coming year under the Federal Coastal Zone Management Act which was reauthorized in 1980. This Act was an all encompassing one that was reauthorized for five years, and was done so after extensive hearings and public debate and Congressional oversight. Under this Act, the Organization is willing to cope with different levels of funding and has done so by taking a phase down stance in dealing with the Administration's budget cuts. However, the Organization believes that the Act should remain intact even with the limited funding and that its intent should not be changed. This last year, due to budgetary considerations, the Coastal States Organization agreed that a reduction in funding would need to be made, and in taking this stance, understood at that time that the $33 million dollars of Section 306 funds and the $7 million dollars of Coastal Energy Impact Program Funds would indeed be representative of this reduction position. The rescission before Congress of removing all $7 million from the Coastal Energy Impact Program and $12 million from Section 306 funding does not support the phase down philosophy agreed to but instead fosters the lack of commitment by the Administration to an efficient management of the Nation's coastal resources. In addition, it places the states again in the precarious position of not being able to assume the funding gap created by the Federal level.

2. The Coastal States Organization asks for your support of supplemental 306 funding for New York and New Hampshire, and there is a source of funding that could be used which would not detract from the phase down philosophy fostered by the Administration. In FY 1983, there will be approximately $16 million paid back into the Coastal Energy Impact Program Loan Fund. These loan proceeds are being transferred out of Coastal Zone Management Act functions and are being absorbed by other programs within NOAA. The Coastal Organization asks for your support in diverting $4 million of these funds to be used by the New Hampshire and New York programs who have just had their programs approved.

3. The Coastal States Organization asks for your support of legislation that encourages the concept of Outer Continental Shelf Revenue Sharing for funding state coastal zone management activities, the Seagrant Program and state programs that were once funded under Federal Fisheries Assistance. This would reverse the lack of commitment currently taken by the Administration and would strengthen the funding basis from a year to year appropriation to one of a more consistent nature that states need in order to manage their resources. Recent surveys show that, without an alternative to current funding schemes (i.e., the phase down approach), between 60 and 80 percent of state staffs will be lost and this includes staff that are responsible for carrying out eviction statutory review for OCS activities. This places states in a bind because not only are the Interior Department's activities under the 5-year leasing schedule being accelerated but also, national legislation dictates that state coastal management programs should play a role in this development. Moreover, while states may receive some potential benefits from OCS activities, they clearly will receive all the adverse environmental, safety and boom-growth consequences at a time when virtually all Federal financial assistance to support the vital research, coastal management, and impact mitigation is being eliminated.

Not only are the Coastal Zone Management Programs important, but the Seagrant Programs and the state Fisheries Programs are all important beneficiaries of this legislation as well. The Seagrant Program, whose function has been to provide supplemental research and technical data analyses to the states as well as to other entities needs to be supported. Without their effort, environmental and data base analyses upon which management decisions are made would be lost.

Our coastal fisheries are no longer state resources; they are being viewed as regional resources and international resources as well. Without the ability to conduct species surveys or the ability to properly manage these resources which efforts had been funded by Federal Fisheries Assistance Programs, our fisheries may become a depleted resource subject to the varied demands placed upon them. In other words, all three efforts and programs are needed. They are not duplicative and each one serves a separate constituency. All three efforts have been separately authorized and supported, and all three use professional practitioners to deal within their respective areas of interest—coastal concern.

Secondly, I wish to address the organization trend toward ocean issues within NOAA.

1. The Coastal States Organization asks for your close examination of this trend because it appears as if coastal issues will no longer be addressed and ocean issues will move to the forefront. As an example, how will NOAA be able to state that his trend will lead to more relevant research, more useful services and better management of coastal resources when the activities are taking on an ocean focus and when the Great Lakes States are not even ocean related nor do they concern themselves with marine operations, ocean engineering and technology development which are the suggested supporting activities of this reoganization?

There is a simple law of ecology that states: "Everything is connected to everything else." Coastal areas and ocean areas do impact upon one another. A balance of emphasis on development, conservation and preservation needs to be maintained both from a coastal perspective and an ocean perspective. Concentration upon one area at the expense of another will cause an imbalance and that goes against the intent of the Federal Coastal Zone Management Act and the Outer Continental Shelf Lands Act Amendments which stressed that the interface upon which we should concentrate is that interface between land and water. Let us not lose the quantum leap we have taken in focusing management in this area.

Senator SCHMITT. Thank you, Doctor. I think what I would like to do is have you maybe move over to the side of the table a little bit, and we will ask you to respond to a few of the questions we will ask Dr. Byrne and his colleagues, and we can bring them forward. I think it will be a little more efficient.

Dr. Byrne, would you come forward? Dr. Byrne is the Administrator of NOAA. Would you introduce the colleagues that are accompanying you today?

Dr. Byrne, your testimony will be included in the record in its entirety. We appreciate the obvious work that has gone into it. It will be very helpful to us if you could summarize, and then we will have a few detailed questions for you.

STATEMENT OF DR. JOHN V. BYRNE, ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE; ACCOMPANIED BY JAMES P. LAWLESS, DIRECTOR, OFFICE OF OCEAN MINERALS AND ENERGY; WILLIAM MATUSZESKI, ASSISTANT ADMINISTRATOR FOR COASTAL ZONE MANAGEMENT; ROBERT B. ROLLINS, ASSOCIATE DIRECTOR, OFFICE OF PROGRAM DEVELOPMENT AND MANAGEMENT, NATIONAL OCEAN SURVEY; NED A. OSTENSO, ACTING ASSISTANT ADMINISTRATOR FOR RESEARCH AND DEVELOPMENT

Dr. BYRNE. Thank you. I would like to introduce the people who have accompanied me here at the head table. On the right is Jim Lawless, who is the director of our Ocean Minerals and Energy Office. Immediately to my right is Mr. William Matuszeski, who is the acting assistant administrator for Coastal Zone Management in NOAA. On my left is Dr. Ned Ostenso, who is presently the acting assistant administrator for Research and Development. On his left is Mr. Robert Rollins, who is representing the National Ocean Survey today. We have several colleagues elsewhere in the audience that we may call on if questions become very specific.

We welcome the opportunity to meet with you today and this testimony, which is somewhat lengthy. We think the series of hearings that have been set up will provide an excellent overview of the activities of the National Oceanic and Atmospheric Administration, and the statements which have been prepared for the record will be an excellent summary of the activities that are taking place.

Today we want to focus on the ocean programs within NOAA. It is our impression that we are seeing a very significant increase in attention to the oceans, not only in terms of mineral wealth, but also in terms of ocean thermal energy production, the use of the oceans as a receptacle for waste, the rising volumes of maritime traffic in many of the waterways, problems associated with oil and gas production, not to mention the increased use of the living resources of the sea.

In short, it is obvious that our use of the oceans is increasing. Within NOAA, we are making an attempt to address this increase by reorganizing the agency to provide greater efficiency for operations involving the ocean and a greater focus on ocean activities. We believe there are a number of things that need to be done. In focusing on ocean activities, we feel that there is ample opportunity for increased service to the users of the ocean in terms of providing information on a real-time basis, not only in the ports and harbors of the country, but across the oceans as well.

Now, for purposes of this hearing, we have structured the testimony that you have before you according to the best thinking we have at this time on how we probably will organize the ocean activities within NOAA. We are focusing on ocean services, ocean management, the ocean research activities, and the more traditional mapping, charting, and geodesy activities.

In addition, the testimony also addresses the reauthorization of three existing acts: Title II of the Marine Protection, Research, and Sanctuaries Act; the National Ocean Pollution Planning Act; and the Deep Seabed Hard Mineral Resources Act. We are proposing that all of these acts be reauthorized and are prepared to comment on them if it is appropriate.

Rather than go into a lengthy description of all the activities that are outlined in the testimony, I would highlight these simply by saying that under the ocean services category we would include a section involved with ocean investigation and services that provides data on a real time and a predicted basis for the users of the ocean. We will continue to carry out activities in pollution assessment and certain ocean dumping research activities.

The data and information which are acquired through these and other services will be monitored through our environmental data and information service. This particular service provides information after the fact, as well as synthesizing much of the data that is available for future use.

The other two sections in the ocean service category address the matter of ship support and ocean technology. We operate a fleet of 22 vessels for all of the activities involved with the ocean that NOAA carries out. Our ocean technology program involves the development of new equipment in support of many activities carried out by NOAA, as well as data buoys which provide real-time information involving weather and the upper surface of the ocean.

In the category of ocean management, we address the coastal zone management activities, which we see continuing in spite of the cutback in the funding of grants to States. We believe this is an important program and that it has come far on the basis of the grants, to the point where I think all of the States recognize the importance of coastal zone management. We see a continuing, significant role in monitoring future activities and assisting the States technically as they continue their programs.

This particular category also includes programs involving marine and estuarian sanctuaries. We also include our activities in ocean thermal energy conversion, which are primarily in the licensing area, and deep seabed mining.

With respect to ocean research, the research we presently conduct on a formal basis exists at the Pacific Marine Environmental Laboratory, at the Great Lakes Laboratory, and at the Atlantic Oceanic and Meteorological Laboratory. We are prepared to address questions on these three laboratories and the activities which take place with respect to environmental research.

We see a significant role for the universities and for other private research organizations outside of NOAA to conduct much of the research which is of value to us as we make use of the oceans. As such, the national sea grant program has demonstrated, we believe, remarkable success. We see the expansion of activities with universities and other areas of atmospheric and oceanic science, not specifically an expansion of sea grant.

We maintain a manned underwater research capability not only for NOAA scientists, but also on behalf of the university and other private investigators.

The fourth category in our ocean activity is that which is traditionally thought of as mapping, charting, and geodesy. Here we address topics in terms of mapping and charting. We recognize that we are going into a period of change and we are, in fact, in a period of change, in that the charts we have been producing over the last 100 years probably do not serve the needs of the new users of the ocean.

We have engaged in a technologically advanced electronic display. We anticipate moving in that direction more than we have in the past. We will also continue to provide aeronautical charts and all of the supporting materials that are required by general and commercial aviation through our aeronautical charting activities.

In the area of geodesy, the horizontal and vertical grids which have been developed for the country are continuing to be updated. We are looking at advanced technology that uses long-baseline interferometry for improving the accuracy of these systems, and we will continue to move in that direction.

The remainder of the testimony addresses the reauthorizations and the Marine Protection, Research, and Sanctuaries Act, the National Ocean Pollution Planning Act, and the Deep Seabed Hard Minerals Resources Act. We will be prepared to answer any questions on any of these topics, Mr. Chairman. I appreciate the opportunity to summarize the contents of the testimony which we have prepared and we look forward to any questions you might have.

Thank you.

Senator SCHMITT. Doctor, that is very helpful.

Doctor, looking at a very, very broad view, would you not say that in terms of this Nation's position in the world as a maritime nation, with a limited resource base, and with a great dependence on international commerce, that is ocean dependent, that the total Federal emphasis on oceans relative to that longer-term view is inadequate, and that whatever we may be going through now as the result of budgetary constraints is temporary and must be temporary for a maritime nation such as the United States?

Dr. BYRNE. We see increased use of the oceans, as a maritime nation. The fact that we do recognize this was one of the major reasons for attempting to reorganize the agency to provide more focus on the ocean activities which have been carried out in a very capable manner throughout NOAA. It is our assessment, however, that during this period of economic difficulty we must make every effort to operate as efficiently as possible and provide the kinds of services and products that are most useful to the user community.

Senator SCHMITT. What I am saying, Dr. Byrne, is, that is great, but some of the justifications I hear sound as if you think a relatively low level and maybe even a further reduction in ocean related activities is the wave of the future, rather than just a temporary aberration brought about by our economic difficulties.

Mr. BYRNE. I am confident it is a temporary aberration. I concur with you, Mr. Chairman, that we will see continued increasing use of the oceans. I think the thing we will see and the thing this administration is striving to develop is a closer relationship with the private sector in terms of services that they can provide, assuming the Federal Government provides the opportunity and the environment for that, and also an increase in user fees and contracting for carrying out many of these services.

I am confident that the services, whether they are conducted by the Federal Government or by private commerce, will increase in the future. We will see more and more opportunity for the Nation to develop the resources of the ocean and make better use of it. The oceans will become more important to this country.

Senator SCHMITT. They will not become more important. They are more important. The question is, Does our perception of that importance change? Frankly, I have not seen too much sign of it, certainly in relation to the importance that other nations, including the major continental power on this planet, the Soviet Union, places on the oceans.

We are really falling further and further behind, already having been at the end of that particular train of nations. And I hope that even though we will look at our economic difficulties as having the highest priority at this time, within a few years that can no longer be the case, or acceptable, I think, to the American people.

Dr. BYRNE. We are attempting as part of our reorganization to focus on the greater use of the ocean. In addition to the reorganization, we are going through a long-term strategic and operational planning exercise that should lay the groundwork for expansion in the future.

The activities we are addressing today all move in the direction of greater use and greater involvement than we have had in the past.

Senator SCHMITT. Is there any consideration within NOAA to develop a matching program in the sea grant and other research activities, to further tap the private sector's involvement and interest in these areas?

Dr. BYRNE. The sea grant program in the past has involved a matching component. As the universities have become adjusted to that, more and more of the match has come from the private sector rather than from Federal funds. As we look ahead, we see increased involvement with the universities.

We believe, at least I personally believe, that NOAA has not been contributing enough and has not been making as good use as it might of the talents that exist within universities. So I see more and more of our research, particularly that research that some would say is longer term, or might even call fundamental, being carried out by that university community.

I think it is particularly appropriate during a period of economic difficulty that we focus all of the available resources. Certainly the universities as well as private industry have a major contribution to make in this area. I am not sure we have taken advantage of that in the past to the extent we might. As we develop our plans and our reorganization, we are looking for a much stronger tie with the universities and with the private sector.

Senator SCHMITT. Senator Gorton?

Senator GORTON. I have a few questions, if I may, on seabed mining, for you. Can you start by telling me what the current status of the seabed mining reciprocating States negotiations is?

Dr. BYRNE. As you are aware, Senator, the reciprocating States negotiations were very intense prior to the beginning of the present session of the Law of the Sea Conference in New York City. Unfortunately, we were unsuccessful in achieving signature on a reciprocating States agreement. The intent, however, was that we would view very carefully the activities at the Law of the Sea Conference. We hope that a reciprocating States agreement would, in fact, be signed and agreed on subsequent to the close of that conference.

Senator GORTON. In other words, they are more or less suspended while that conference proceeds?

Dr. BYRNE. I suspect there is a great deal of conversation going on at that conference among the mining nations. The intention with the reciprocating States agreement is that until such time as a Law of the Sea Treaty enters into force the reciprocating States agreement would serve the mining interests of this country as well as the other countries.

Senator GORTON. Which of the nations involved in the negotiations also have domestic seabed mining legislation of their own?

Dr. BYRNE. I will give you my answer, and then, if I am incorrect, Mr. Lawless here will correct me.

I believe that the nations which have their own legislation include the United Kingdom, the Federal Republic of Germany, and France. Correct, Jim?

Mr. LAWLESS. And Russia.

Dr. BYRNE. And now Russia.

Senator GORTON. Can you give us any estimate as to when there will be signatures on some form of reciprocating States agreement and how that relates to the present legislation?

Dr. BYRNE. I would like to pass that question to Mr. Lawless, who was directly involved with those negotiations. Jim?

Senator SCHMITT. Is this Mr. Lawless of the Sea?

Senator GORTON. That is terrible.

Senator SCHMITT. I could not resist. I am sorry. I have been trying to be a good boy.

Mr. **Lawless**. Senator Gorton, as Dr. Byrne has indicated, we essentially concluded the substance of our negotiations on the reciprocating States agreement prior to the Law of the Sea session. We are anticipating in essence picking up where we left off after the conclusion of the session, which presently is scheduled for April 30.

Senator **Gorton**. What is the rationale of that decision? Was this something we made or was it because the other States wanted to go through the LOS negotiations first?

Mr. **Lawless**. It was a joint decision. I believe all the countries involved thought it was inappropriate to be participating in active reciprocating States negotiations in the midst of the Law of the Sea negotiations.

Senator **Gorton**. Are the provisions of our seabed mining law and the provisions of LOS in its current form consistent, or how do they clash?

Mr. **Lawless**. That is difficult to answer, Senator, because the Law of the Sea Treaty is still evolving at this point. Based on the last version that I am aware of, they are not totally consistent. On the other hand, I don't believe that Congress intended the U.S. statute to remain rigid. There is recognition that if the Law of the Sea Treaty comes into force with respect to the United States, if it is ratified by the United States, then obviously we would get into a situation of amending U.S. law to implement that treaty.

Senator **Gorton**. Would it be fair to state that our position in LOS is to move that treaty closer to the rationale of our own statute?

Mr. **Lawless**. Yes, I believe that is accurate.

Senator **Gorton**. Could the reciprocating States agreement, to the extent that it has at least been informally framed up in its present form, provide an effective seabed mining regime in the absence of an LOS treaty acceptable to the United States?

Mr. **Lawless**. The agreement that we have negotiated so far is intended to be one which is interim pending the entry into force of an acceptable Law of the Sea Treaty. So that in its present form you probably could not consider it as adequate on a permanent basis. However, I suppose it could form the foundation for such an alternative regime.

Senator **Gorton**. And we would have to go forward with it and make additions?

Mr. **Lawless**. That is correct.

Senator **Gorton**. What is the likelihood of U.S. companies proceeding under the U.S. flag if we decide not to sign an LOS treaty, which is nevertheless signed by our allies?

Mr. **Lawless**. I think under the present circumstances the likelihood would be fairly low.

Senator **Gorton**. Can you amplify that answer a little bit as to why?

Mr. **Lawless**. Basically, what the mining companies are faced with is an investment climate, that is created by the nature of the program that we are administering and what ultimately might be produced by a Law of the Sea Treaty. The companies want a legal regime which provides sufficient certainty and assured access to portions of the seabeds, so that when a company needs a substantial amount of funds in order to go into full-scale commercial recovery, it will have something that is salable to a bank.

I believe they would have difficulty convincing the bank to advance them the necessary money if the United States failed to sign a Law of the Sea Treaty and everyone else in the world did sign it, unless there were other considerations that do not exist right now.

Senator GORTON. Would you answer a factual question for me. Where is the line at sea between areas which would continue to be under the exclusive jurisdiction of the United States and those that would be subject to the Law of the Sea Treaty in an international regime formed to manage it? How far out?

Mr. LAWLESS. Under present law it would be essentially, as far as the United States is concerned, the Continental Shelf. Under the proposed Law of the Sea Treaty, it would be within an exclusive 200-mile economic zone.

Senator GORTON. The end of the Continental Shelf, whatever distance that is from shore?

Mr. LAWLESS. Yes.

Senator GORTON. Are there areas just off the Continental Shelf of the United States which appear to be likely mining sites?

Mr. LAWLESS. The companies that have been out there so far seem interested at the present time exclusively in the area that is known as the Clarion-Clipperton Zone of the Pacific Ocean, which is well beyond the Continental Shelf of the United States and other countries.

Senator GORTON. There is no one in charge of determining whether or not, or what kind of environmental impacts there are in that kind of a proposed deep seabed mining?

Mr. LAWLESS. We have developed preliminary information on potential impacts through the program known as the deep ocean mining environmental studies, or DOMES. It was conducted between 1975 and 1980. That effort was designed to acquire baseline data, as well as some preliminary monitoring or assessment of some industry testing that was going on in the late seventies.

On the basis of that we have been able to make some more focused predictions of the probabilities of what may or may not happen from deep seabed mining. But there are still some unresolved issues that we need to investigate further.

Senator GORTON. Thank you for your answers to those questions.

Dr. Byrne, on a different subject and in my case a somewhat more parochial one, what is the current status of your project at Sand Point and your current policy on ships in Lake Washington?

Dr. BYRNE. The Sand Point activities are moving ahead. We have decided to finish the facilities and complete the three research buildings. There is an auditorium building which is also under construction. There will be a modest staging pier constructed at the site which has previously been dredged. It is our anticipation that the NOAA fleet will not spend any significant time within Lake Washington, but rather will continue to operate out of Lake Union. Vessels will be brought in only as the occasion demands to stage them for extensive cruises.

Senator GORTON. Mr. Chairman, should I go on?

Senator SCHMITT. It depends on your schedule.

Senator GORTON. If I may ask a few more questions, I would appreciate it.

Senator SCHMITT. Please do.

Senator GORTON. Would you describe the user fee proposals which you have in connection with the charts and maps and the like, and what kind of groups would be impacted and what the kind of costs imposed on them would be?

Dr. BYRNE. The user fee proposal with respect to nautical charts anticipates that the program would be fully supported through user fees at the end of 3 years. This means that all of the costs involved in the production of a chart starting with the original survey would be covered. Eventually, on the basis of what we see as the present market, we would have a graduated system over a 3-year period that would increase the cost of the chart until the whole program is covered.

The charting program itself will be funded as part of our budget. However, the user fees coming in from the sale of the charts will return to the Government.

Senator GORTON. That means a cost increase of 10 to 15 times over present charges, does it not?

Dr. BYRNE. Yes, I think it does come out to that. The ultimate estimate that has been made is that the chart at the end of 3 years that now costs $4.50 would cost $45, approximately.

Senator GORTON. This would impact primarily recreational boaters, fishermen, commercial, the merchant marine fleet, and the like?

Dr. BYRNE. It would certainly impact anyone who is presently using nautical charts. We think it will obviously cut down on the number of people who are purchasing charts for decorative purposes and that sort of thing. But the charts used for safety purposes would continue to be purchased by the users of the ocean.

Senator GORTON. One further subject. The Pierce County health department has closed 1 of the 13 ground water aquifers in South Tacoma due to high concentrations of toxic chemicals, which are also apparent in Commencement Bay and which in fact were found by NOAA itself. And yet, I understand that your proposed budget ceases the research project in Puget Sound which impacts Commencement Bay.

Can you tell me the rationale for that and what share of the total funding for your national projects is attributed to the Puget Sound portions?

Dr. BYRNE. Let me answer the general parts first. It may be that we will have to provide the specifics on that for the record, if that is all right.

Senator GORTON. Obviously.

Mr. BYRNE. Although the budget does indicate that Puget Sound MESA project would be closed down prematurely, we do anticipate continuing it for the foreseeable future as part of the activities involved with the Ixtoc Well problem in the Gulf of Mexico. Funds were taken from the Office of Marine Pollution Assessment to address that particular crisis in the Gulf with the understanding that the funds would be returned to them when they became available.

Charges were made to the Coast Guard, and in fact the Coast Guard has in a sense paid its bill, and those funds will be returned to the Office of Marine Pollution, and it is my understanding that they will be used to continue the Puget Sound project.

Senator **Gorton**. To completion?

Dr. **Byrne**. They would not be adequate to continue it to the completion that was originally proposed.

Senator **Gorton**. How much more in the way of dollars would be necessary to accomplish that goal?

Dr. **Byrne**. This particular program is under our research and development activity, which is why I have asked Dr. Ostenso if he would respond to that particular question.

Dr. **Ostenso**. In the face of the fiscal realities under which we are working, Senator Gorton, we have made a strong effort to preserve the basic research program that is relevant to marine pollution. We have reduced the amount of money that is targeted to specific areas, with the understanding that the local region should have a vested interest in its support.

We have preserved the core of our fundamental research in ocean pollution, including issues that are relevant not only to New York but Puget Sound and Commencement Bay.

Senator **Gorton**. That is a very good rationale, but it is not an answer to the question I asked.

Dr. **Ostenso**. The original plan of research for Puget Sound was scoped out to be a 5-year task. The reduction in funds that were earmarked for Puget Sound was $1.1 million. In answer to your earlier question, the funds that we are getting back from the Coast Guard for previous work related to Ixtoc will be Puget Sound to bring NOAA's present effort to an orderly conclusion.

Senator **Gorton**. So the total difference, then, is considerably less than $1.1 million. Some of it is coming back to the Coast Guard that would be needed?

Dr. **Ostenso**. For the coming fiscal year, that is true.

Senator **Gorton**. I still do not quite have the answer as to how much in additional funds would be necessary over and above what is being returned by the Coast Guard to complete the project as it was originally designed.

Dr. **Ostenso**. I would prefer to supply this for the record.

[The following information was subsequently received for the record:]

The rationale for reducing the research project in Puget Sound is that, especially in view of the current, heightened importance of fiscal restraints on Federal programs, the local region should have a vasted interest in funding whatever continuing research is necessary there. The initial brunt of these research needs has already been relieved by NOAA through the major course of investigations conducted there since 1975 with the expenditure of $5.9 million of NOAA funds and nearly $5 million of EPA passthrough funds, a total near $11 million.

In the last complete fiscal year, fiscal year 1981, funding for the Puget Sound portion of NOAA's $16.8 million Marine Ecosystem Investigations activity was $1.3 million, or 8 percent.

The latest direct congressional appropriation to NOAA for Puget Sound research, in the fiscal year 1979 budget, described funding of $1.3 million annually for four years followed by a fifth year phaseout of $0.4 million. In view of the above rationale NOAA believes that environmental understanding as a basis for management decisions in the Puget Sound region has advanced to a stage where NOAA can phase out this research in fiscal year 1982. This will save $1.7 million as compared with the initially planned phaseout in fiscal year 1983. The phaseout in fiscal year 1982 will be funded with $0.6 million which is being returned from the Coast Guard in response to the IXTOC oil spill in the Gulf of Mexico. These funds will support

the completion of ongoing field work and preparation of research papers and assessment reports so that environmental managers will have NOAA's results documented for their use. NOAA will continue to support fundamental research in ocean pollution, including research relevant to the issues in Puget Sound.

Senator GORTON. That is perfectly all right.

Mr. OSTENSO. My recollection was something like $1 million a year over a 5-year span.

Senator GORTON. One last question, Dr. Byrne. In what way will services to the Pacific Northwest be reduced as a result of the reduction of two west coast data buoys? And I suppose in answering that you might explain what the nature of that program is.

Dr. BYRNE. The data buoy program is one in which we have placed large buoys in the ocean. I think presently there are 14 of them, which monitor automatically certain parameters of the atmosphere and the upper surface of the ocean. They relay this information via satellite to the National Weather Service.

They are used primarily for weather forecasting. Those in the Pacific, of course, provide very needed ground truth.

Senator GORTON. How many of them are in the Pacific?

Dr. BYRNE. There are six, Senator.

Senator GORTON. All right. Go ahead.

Dr. BYRNE. The two buoys which have been proposed for withdrawal are located very close to Great Circle transportation routes. We are assuming that we could obtain some information from ships in the vicinity. In our present situation, because we are going through some readjustments, we think that it may be possible to request a reprograming to insure that the buoys are not, in fact, withdrawn from the ocean.

Senator GORTON. And you are actively pursuing that, also?

Dr. BYRNE. We are actively pursuing that, yes, sir.

Senator GORTON. I thank you very much.

And I thank you for your indulgence, Mr. Chairman.

Senator SCHMITT. Thank you, Senator. You were asking all the right questions.

Dr. Byrne, do you expect more State coastal zone management programs to be approved this year?

Dr. BYRNE. I would like to hand the coastal zone management questions to my colleague, Mr. Matuszeski, who is the Acting Assistant Administrator for Coastal Zone Management.

Mr. MATUSZESKI. Yes, Senator, we are expecting to approve the New Hampshire and New York programs this year.

Senator SCHMITT. Do you think there is enough money for them to implement those programs?

Mr. MATUSZESKI. We have indicated to both States, that funding will be difficult, particularly in the case of New York. Because of the size of the State, the amount of money is around $3 million.

Senator SCHMITT. Have you suggested to them any alternative means of financing?

Mr. MATUSZESKI. We have suggested that they talk to their colleagues in the Coastal States Organization concerning their willingness to share some of the funds that have been made available as a result of congressional action last year, yes.

Perhaps Dr. Taylor would like to speak to that.

Senator SCHMITT. Dr. Taylor.

Dr. **Taylor.** I believe you will recall the testimony which supports pretty much what the Coastal States Organization decided upon a couple—well, it was the first week in March—was that the funding that is available from the paybacks in the coastal energy impact program loan fund is about $16 million at least, and we were asking, and our Coastal States Organization is going around to the congressional members asking, that approximately $4 million of that funding source be taken and used specifically for the first year of implementation for both States' programs that will be approved by Office of Coastal Zone Management. That is the position we have taken.

Senator **Schmitt.** Dr. Byrne, regardless of what the funding level might turn out to be, there are certain responsibilities assigned to the Office of Coastal Zone Management. How do you see that Office functioning in light of these responsibilities under the proposed budget?

Dr. **Byrne.** I think we feel the proposed budget is adequate for the operation of the Office. The big change that takes place, of course, is the grant programs to the States have been eliminated. We would also maintain activities as part of the marine sanctuary program and the estaurine sanctuary program.

I personally see the coastal zone activity as an extremely important one which will continue to be important to the agency, in spite of the fact that we will not be making grants to the States specifically to develop and implement programs.

My assessment is that the budget for 1983 is adequate to serve our needs in this area, and we will continue to do that.

Senator **Schmitt.** Is this a matching program?

Mr. **Matuszeski.** The majority of the coastal zone management operations grants, are 20 percent State-matched, yes, sir. The coastal energy-impact program grants vary, but for the most part are 30 percent State-matched.

Senator **Schmitt.** Dr. Byrne, what specific advantages do you see in the proposed reorganization?

Dr. **Byrne.** I think the most significant advantage is that we bring together for the first time all of the activities in which we are involved with the ocean. We see the opportunity to increase some management efficiencies. More important than that is the fact that programmatically we are beginning to bring together those activities which have direct interrelationship with each other.

Senator **Schmitt.** Do you think, however, that the synergistic needs between the various programs are going to be satisified by whatever mechanism you put in place to do that?

Dr. **Byrne.** I do not think they are to be put in place just by a restructuring of the agency. We have made very conscious attempts during the past 9 months to increase the communication among all the components within NOAA. As we have done this, we began to find that there are areas where mutual activity that has not existed in the past would be extremely beneficial.

The short answer is that the restructuring of the agency will not do this. But with very conscious attempts to enhance communication within the organization and activities that use talents collectively, we will see a tighter approach to solving problems involving the oceans and using all of the talents that are available within NOAA and also those outside.

Senator SCHMITT. Within NOAA how is long-term planning going to be implemented under the reorganization?

Dr. BYRNE. Again, I think the reorganization does not do that. We are in an early stage in attempting to put together a 5-year plan for the agency with a 10-year outlook. As I personally become more involved with this, I see the need to look even beyond 10 years, for some of our capital improvements and this sort of thing.

This year we brought together the assistant administrators and other directors of some of the main-line components, to share what the present programs were and to focus on some of the future needs, as we perceive them at this time, and to use that as the basis for developing a programmatic approach to satisfying those needs.

We are taking formal steps to develop a planned mechanism, and this is done, in a sense, in a collegial way. I think when this is done, the process will become an annual exercise in which we update the operational plan as well as the long-term 5-year plan.

Senator SCHMITT. Do you think 5 years is enough? Do you not think you ought to be looking 10 years ahead? At least the length of a solar cycle?

Dr. BYRNE. I indicated in my earlier comment that we are doing a 5-year plan with a 10-year outlook. We find that 5 years is probably even longer than we may logically plan. And that is the reason for the annual update of the 5-year plan. Certainly, we have to focus on 10 years. In fact, in looking at facilities requirements for the future, we need to keep in mind that it might take longer than 10 years to develop the facilities that are needed.

Senator SCHMITT. Dr. Byrne, very briefly, with respect to the Law of the Sea, Senator Gorton asked several questions, and we will have others for the record. But to the degree that you are involved, I hope that those who are currently negotiating recognize there is a very considerable interest in this committee relative to that treaty.

There are many on the committee, I think, in the Congress who are very, very skeptical of the treaty, the draft treaty that was almost an issue in 1981, skeptical that a one-nation-one-vote regime would be very, very detrimental to the interests of the United States and, in fact, over the long haul detrimental to the interests of the developing nations.

And we hope that whatever is done is done in full consultation with the members of the Senate that must eventually ratify that treaty.

What role does NOAA have regarding the site selection for ocean dumping?

Dr. BYRNE. Mr. Chairman, I would ask Capt. Larry Swanson, who heads our marine pollution assessment program, to approach the microphone and answer questions involving ocean dumping.

Senator SCHMITT. Surely.

Captain SWANSON. May I ask that you repeat the question?

Senator SCHMITT. What is the role that NOAA has relative to site selection for ocean dumping? And you might at the same time distinguish NOAA's role from that of EPA's with respect to ocean dumping in general.

Captain SWANSON. I will answer the last part of the question first. NOAA has no regulatory responsibility with regard to ocean dumping. Our role has been primarily conducting assessments of existing ocean dumping sites; trying to advise EPA where ocean dumping should take place, if it should take place at all; and essentially to be a scientific consultant to the EPA on ocean dumping matters.

With regard to selection of sites, we have been more involved in looking at the generic problem of sites as opposed to looking at specific sites. For example, we look at the Continental Shelf in the broad context, and we look at the deep ocean dumping alternative in the broad context. The reason is that we do not have the resources to look at numerous sites around the country on a case-by-case basis.

Senator SCHMITT. Do you think you should look at them on a case-by-case basis? Is there any benefit worth the cost in that effort?

Captain SWANSON. The cost would be considerable. I think that is a decision that is really not mine to make. There are, for example, probably close to 120 to 150 dump sites being considered by EPA. And for NOAA to undertake examination of each of those sites would be a task that would be very costly and the manpower necessary for NOAA to do that would also be very large.

Senator SCHMITT. Dr. Byrne, do you think NOAA should have any regulatory responsibility in ocean dumping?

Dr. BYRNE. I think that the present responsibility we have is an appropriate responsibility for NOAA. I think that the Federal Government should certainly maintain a regulatory role in one agency or another. At the present time, EPA has that role.

Senator SCHMITT. Do you think that is appropriate? Or should it be combined with the agency that does the research, as is so often advocated?

Dr. BYRNE. I think the present situation is an appropriate situation.

Senator SCHMITT. Is appropriate?

Dr. BYRNE. Yes. In this particular case, the regulatory body which is regulating pollution in a variety of environmental settings should maintain that overview. By the same token, NOAA as a research organization and as an operating service organization, does have particular talents with respect to the ocean and the atmospheric environments and we should be called on appropriate occasions to use those talents.

Senator SCHMITT. I agree with you. I think it would be a disaster for NOAA to get any more deeply into regulatory activity than it already is. It would cease to be able to talk to us, I think, about science and research.

Restriction on sewage effluent dumping has been eased recently. Ocean dumping of sewage is expected to more than double in a few years. Do you feel this might be a particularly sensitive time to propose reduction in ocean dumping research?

Dr. BYRNE. I am sure it is. As we look at the problems that face us in the ocean, ocean dumping, which is a conscious act, is an important use of the ocean. It should be done wisely.

The approach that we have taken, in view of the economic situation, is rather than focus on specific sites or specific regions, to look at the environmental problems associated with dumping in a more generic way.

We have, in the case of New York Bight-Hudson Bay-Raritan Estuary reduced our activities, with the understanding that the chemical and physical processes that affect the materials added to the ocean and their impact on the biota and the ocean will continue to be monitored and studied, but in a different setting within the agency.

Senator SCHMITT. Are you looking at alternatives to sewage dumping, such as irradiation?

Captain SWANSON No, sir. We do not look at land-based alternatives. We are looking at alternatives that are available only in the ocean.

Senator SCHMITT. Well, how does the Government then evaluate alternatives? If you do not look at it, who does?

Captain SWANSON The EPA is presently charged to look at the alternatives to ocean disposal. And as a matter of fact, the Ocean Dumping Act was changed several years ago to specifically give EPA that authority.

Senator SCHMITT. Do you know if they are doing it?

Captain SWANSON It is my understanding that they are setting up a program within EPA to look at the multimedia management of waste. In that context, NOAA will play a role in assisting them in looking at various alternatives in the ocean.

Senator SCHMITT. Dr. Byrne, do you believe that NOAA should be involved in geophysical activities that deal with the solid earth?

Dr. BYRNE. At the present time we are involved with those. Yes, I think we should continue to maintain our geodetic capability.

Senator SCHMITT. Why?

Dr. BYRNE. This goes back traditionally to the determination of the datum plane—specifically sea level—and has developed from there. We have developed an expertise which interlocks, I think, reasonably well with surveying activities in coastal waters.

And that has expanded, as you know, into a cadre of very competent geodesists who are measuring and laying out the horizontal and vertical grids on which all mapping of the continent is based. It ties in reasonably well with our offshore charting activities and it is our contribution to land charting.

Senator SCHMITT. Would it be consistent with NOAA's history and current types of services to be more deeply involved in earthquake prediction?

Dr. BYRNE. I think we have traditionally seen that the expertise for earthquake prediction has come through the geological sciences.

Senator SCHMITT. Such as that renowned geological organization known as FEMA?

Dr. BYRNE. I am not prepared to comment on FEMA, sir. The expertise on understanding earthquake mechanisms exists within the United States Geological Survey.

Senator SCHMITT. But they do not have the responsibility for the earthquake hazards program. They have the responsibility for research but not for organizing the program.

Dr. BYRNE. That is correct. If I could interpret or analyze your question somewhat, the fact is that NOAA does have a number of units which do provide forecasts. It has a system for dissemination of information that might make it an appropriate agency. I think it would require major study before we would be prepared to say yes or no, we are not the appropriate agency for such a prediction.

Clearly, once a decision has been made that an earthquake will occur in a given location within a certain period of time, I think we are prepared to use the existing dissemination programs we have, most specifically, the NOAA weather wire and NOAA weather radio.

As a slightly different example, it is my understanding that information about radioactive gas emissions from one of the power plants in the Northeast was broadcast over NOAA weather radio and NOAA weather wire. So the facilities are available to be used for informing the public. We would welcome that opportunity.

I am not sure, however, that we are prepared, without looking into it in great detail, to provide the predictive capability for earthquakes

Senator SCHMITT. The generic aspects of earthquake hazard and prediction are not greatly different from those of predicting severe weather phenomena and utilizing that predicting generically. Conceptually, they are not different. Obviously, scientifically they are very different. The overall structure of an earthquake hazard, predictive system, including how you use the information once it is available is not unlike what you do for severe weather phenomena; is that not correct?

Dr. BYRNE. I would be prepared to discuss that with you if we agreed that it were similar. Certainly, we do not have the infrastructure established that approaches the structure that we have for the weather service which covers the continent.

Senator SCHMITT. But such an infrastructure would look conceptually quite similar to that which you have for the weather service, would it not?

Dr. BYRNE. Yes, it could.

Senator SCHMITT. And that system has a great deal of experience and success behind it to recommend it for an earthquake predictive system, does it not, for forecasting?

Dr. BYRNE. I have difficulty agreeing with you on this because of my lack of knowledge of the degree of sophistication of earthquake prediction itself.

Senator SCHMITT. Well, it is about where hurricane prediction was before satellites, and we are running a much greater risk. You are fortunate as an agency because you have no significant responsibilities here. But other agencies are running a very, very high risk of not serving the public interest because of the danger of a major earthquake in a highly populated area where hundreds of thousands of casualties are not unlikely. You may not want to assume such a responsibility.

Dr. BYRNE. I do not want to give that impression. We would certainly be willing to provide assistance to a group such as NACOA if they were charged with investigating that sort of activity. My colleague on my left, Dr. Ostenso, has been involved with this activity to some extent. And if he might be permitted to comment on this, I think it might be appropriate.

Dr. **Ostenso**. This is an old and familiar subject for me. When I was in the Office of Science and Technology under Dr. DuBridge, we had an initial study on earthquake prediction, a Steinbergge study, which was more optimistic than history proved to be correct on this thing.

Some years later, when I was here on the Hill, I worked on the current legislation for earthquake prediction. The key stumbling block we had in this whole process, which is uniquely different from weather forecasting and predicting, is the difference between the forecast and the warning. To issue an earthquake warning is really a political process. To issue the forecast is a scientific process.

In the case of the atmosphere, those are so closely coupled in time that you cannot separate the severe storm forecast from the warning which might involve displacement of people, closing down industries and so forth. You do not have the cushion of time to separate what is fundamentally a scientific process from what approaches a socio-economic and political process.

In the case of earthquake prediction, our predictive skill has never been proved. The temporal spacing between prediction and warning could be separated in time by days, weeks, months, or years. The potential for economic and social harm from an inaccurate prediction is absolutely enormous.

I think one of the more creative aspects to come out of this long deliberative process was to recognize the significant difference between the science of earthquake prediction and the socioeconomic-political process of earthquake warning.

Senator **Schmitt**. You really think that is greatly different than the prediction of hurricanes prior to satellites and where they were going to come ashore?

Dr. **Ostenso**. Probably if you asked me that a couple of years ago, my answer would have been no. But we have had some major technical setbacks in earthquake prediction in the last few years. I am not sure we know where we are going.

Senator **Schmitt**. Well, we call them technical setbacks because we have not really focused on making predictions and gathering the kind of data necessary to make good predictions.

Dr. **Ostenso**. Well, we thought we had one in the Palmdale Bulge.

Senator **Schmitt**. But there is no network, predictive network, that exists for earthquakes on which any rational scientist would base a prediction with any certainty, as there is a network for predicting major hurricanes. We have not done that. I agree with your analysis. But it is not because it cannot be done, it is because we have not done it.

Dr. **Ostenso**. Arguments can probably be made for a more sophisticated network of strain gauges and seismometers and so forth.

Senator **Schmitt**. And gas monitors.

Dr. **Ostenso**. Gas monitors and all the rest. Some of the intellectual underpinning that we thought we had for earthquake prediction has proven not to be so good. We are really at a groping stage right now.

You are getting outside of my immediate field of expertise, and I am sounding as if I know more about it than I do. I apologize for that. But I think that the problems are different from the atmosphere problems.

Senator **Schmitt**. I think they are only different in terms of maturity of the science of both forecasting and prediction. Not different in kind.

Dr. **Ostenso**. I think that is fundamentally right, although I would continue to argue that probably the spacing between prediction and warning will always be a different thing between earthquakes and the atmosphere.

Senator **Schmitt**. Well, I suspect that within 10 years you will be proved wrong, if we put the resources necessary. Doctor, I am going to have to let you go. I have another appointment. I appreciate very much your time this morning.

Dr. **Byrne**. Thank you. We have been pleased to be here today.

Senator **Schmitt**. Thank you. The meeting is adjourned.

[The statement follows:]

STATEMENT OF DR. JOHN V. BYRNE, ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE

Mr. Chairman and member of the committee, for many years most people did not fully appreciate the vital role the oceans would come to play in our lives and our economy. Today, however, increasing attention is being focussed on the mineral wealth of the ocean floor, ocean thermal energy production, ocean dumping of sewage the rising volume of matitime traffic in many waterways, and the problems and promise of oil and gas drilling on the continental shelves.

In this context it is clear to me that in coming years NOAA's ocean services will be increasingly important particularly those supporting extraction of offshore oil and gas, upgrading of fisheries and mining of strategic minerals. Private sector consultants are eager to provide such services, but they are hampered by a lack of basic data, adequate forecast infrastructure, and real-time information.

NOAA can be a catalyst for progress by improving the quality, coverage and spatio-temporal resolution of fundamental oceanographic data sets. Because gathering data manually is so expensive, NOAA is looking at ways to develop remote-sensing techniques for operational use, including satellite optical, infrared, microwave, over-the horizon (OTH) radar and CODAR.

We are also working at improving forecasts of marine weather, sea state, ocean courrents and ice pack. Marine weather, forecasts can be improved substantially by incorporating new understanding of severe weather processes into numerical models, and by making greater use of satellite weather data over the oceanss. Waveheight, current and ice forecasts can in turn be improved by better modeling the linkages between these and marine weather, proper incorporation of coastal and bottom-topography effects, and by semi-operational testing of research models.

Third, NOAA must make available information on oceanographic and marine weather conditions in real-time to shippers, pilots, harbormasters and others, by applying new computer processing and data-assimilation technologies to marine data.

Today, I'd like to concentrate on how we can focus our present and highly diverse oceanic activities more sharply, so that development, wise use and protection of our oceanic heritage may be assured. To do this we have proposed, among other steps, a reorganization of NOAA, one aspect of which will establish a National Oceans Services. Many of the functions I will discuss today will utlimately be located in this new unit.

Because we have so many different oceans programs it is difficult to arrange everything into simple catagories. Not everything will fit into one single unit. For example, the Environmental Data and Information Service (EDIS) disseminates ocean, atmospheric and satellite data, once the original collection purposes have been satisfied, and that is where those programs will stay.

For the purposes of this hearing, we have structured our testimony in the form of activity groups that roughly correspond to the proposed reorganization. These categories are: (1) ocean services, (2) ocean management, (3) ocean research, and (4) mapping, charting, and geodesy.

OCEAN SERVICES

Our long-range objective in ocean services is to improve our ability to provide information to the users of the oceans—for example, shipping, fishing, offshore, development, coastal and offshore resource management, and waste disposal—so that they can conduct their affairs safely, economically and with a minimum of environmental disruption. We want to provide information about the oceans equal in sophistication to the information we provide about weather and atmospheric conditions through our National Weather Service. For example, our maritime fleet must be given timely data on ocean conditions so they can adjust schedules or shipping lanes in the safest and most fuel-efficient manner. I will address this challenge in detail later on. We also need to keep tables on waste disposal practices, problems and opportunities vis-a-vis coastal and offshore areas.

Ocean investigations and services

The Oceanography Program of NOS provides physical data on the oceans and Great Lakes in seven countries: (1) tide prediction tables which show time and tide levels at 6,000 locations for one year in advance; historical tide-level data is available for 8,000 locations, some dating back to 1834; (2) tidal data are available for 4,000 coastal locations: (3) detailed Great Lakes water levels, with some records dating back to 1860; (4) annual predictions of tidal currents at 54 major ports and 2,301 coastal locations, and tidal-current charts and diagrams for 12 coastal areas: (5) ocean circulation data for 68 estuarine and coastal regions including current, direction, temperature and salinity profiles, tide levels, and meteorological data: (6) pollution monitoring summaries and water-quality status summaries for northeast coastal waters; and (7) wave statistics.

Tide levels, water levels and circulatory survey data are digitized and processed for maintenance of the data base and computation of predictions. Historical data are now being digitized.

Marine transportation tonnage is expected to increase 20 percentage in the next 10 years, with larger ships and increased port congestion. The high priority of naval defense will increase the demand for the many services provided for NOAA. Accelerated offshore-leasing will greatly boost the exploration and production of oil and gas with operations in deeper and more hostile waters, such as offshore Alaska and the Atlantic Continental Shelf. The potential of ocean thermal energy conversion may lead to commercial plants by the year 2000. Recovery of sand, gravel, shell and other materials is expected to double in 12 years. New industries for the recovery of strategic manganese nodules and polymetallic sulphide ores will gradually emerge. The dramatic increase in commercial fishing is expected to continue, with more than 150,000 vessels in operation. Recreational boating, with a 50-percent growth in 5 years, is expected to reach 20 millions boats and 60 million people by 1990. More than 67 percent of the Nation's population now lives within 50 miles of the coastal shoreline and the Great Lakes.

Information on ocean behavior is basic for navigation, ocean operations and resources management. These data directly effect the growth, efficiency and safety of all marine and coastal operations. A significant portion of tidal data is used to establish marine-boundary baselines and define coastal flood-plains. Tidal data are critical in compiling nautical charts. All vessels require tide, current and wave data for efficient navigation and safety. State agencies and the private sector use these data for land-use policy, coastal engineering.

Pollution assessment

The fundamental purpose of NOAA's marine pollution-assessment program is to foster balanced management of the marine environment. To do this we: (1) provide scientific information to guide National policy decisions on marine pollution issues, (2) plan and coordinate marine pollution research and synthesize and disseminate the results, and (3) evaluate the impact of development, ocean dumping and the accidental release of oil and hazardous materials on renewable and non-renewable marine resources.

The overall NOAA program addressing ocean pollution comprises 16 different activities managed by 9 major program elements. Under our FY83 budget we would continue 12 of these activities with a total budget of $13.0 million. We will defer a number of lower-priority projects and will address the highest priorities in ocean pollution, including the problem of ocean dumping. Thus, we will emphasize research on the long-term effects of waste disposal, especially the physical dispersion and chemical transformation of pollutants in the marine environment and the ecological consequences of present and proposed methods of disposal. This program is conducted in nearly equal parts by NOAA laboratories and by funded studies at various universities and in private industry. Besides our research programs, we will also continue to provide scientific support to the Coast Guard in controlling and limiting damage from major spills of oil and hazardous materials.

NOAA requests support for marine pollution-assessment research at the level of $10.8 million in FY 83, reflecting substantial savings in regional or localized studies which can be funded by state and local governments. NOAA also proposes that the National Marine Pollution Program Office be supported at the level of $645,000 in FY 83 to carry out the mandate of the National Ocean Pollution Planning Acts.

Since title II of the Marine Protection, Research, and Sanctuaries Act and the National Ocean Pollution Planning Act are up for reauthorization this year, I propose to address these two programs in detail later in this statement.

The resources of the nation's ocean and coastal regions generate a wide variety of products and services, and will be even more intensively exploited over the next decade. As economic activity rises along our coasts and in the ocean, conflicts among competing interests become inevitable. What has historically been a simple matter of noncompetitive allocations has become a complex problem of deciding what is the best mix of products and services over time. Given our responsibility at the Federal level to manage these resources so that the Nation receives the maximum net benefits, certain kinds of "strategic" information are required for planning and decisionmaking.

One attempt within NOAA to produce and organize such information is being implemented out by the Office of Resources Coordination and Assessment (ORCA) located within NOAA's Office of Coastal Zone Management. ORCA is now conducting a series of five strategic assessments of the Nation's coastal and ocean regions. Their purpose is to identify large-scale patterns, relationships among biophysical characteristics and resources, present potential resource conflicts and compatibilities, priorities for management action, and research needs and priorities. ORCA has completed an assessment of the east coast, and is currently working in the Gulf of Mexico and Arctic areas of Alaska. Additional projects are planned for the Gulf of Alaska and Pacific coast.

Each assessment analyzes time and space relationships among five categories of data: physical characteristics, flora, fauna, economic activity and management jurisdictions. The assessments rely on existing data, much of it from other NOAA offices. Specific products from the assessments conducted to date include data atlases for each coastal and ocean region, a comprehensive inventory of pollutant discharges from all land-based and ocean-based point and nonpoint sources within each region, large-scale pollutant transport models of the Gulf of Mexico and East Coast, and a computer mapping data-base of the temporal and spatial distributions of more than 300 species.

Information developed in this program is already being used by NOAA, other Federal agencies and the private sector in the assessment of major economic development in coastal and ocean regions. Areas of particular interest are outer contineta shelf oil and gas exploration and development, port development, and ocean and coastal waste disposal options. In addition, this information will be extremely useful for carrying out assessments of damages to marine resources from oil and hazardous substance spills under Federal trustee responsibilities assigned to NOAA under "Superfund" legislation.

A considerable part of the Habitat Investigations Program of the National Marine Fisheries Service is devoted to ocean pollutant investigations, including monitoring. We are also looking at the impacts which increased offshore development will have on survival, reproduction and growth of fish populations. A part of this program is a pilot monitoring effort off the Northeast coast, which conducts systematic measurements of key environmental parameters in offshore waters from Maine to Virginia. We are documenting both present pollutant levels and any long-term trends which could threaten offshore ecosystems, particularly in the vicinity of active dumpsites.

The Great Lakes Environmental Research Laboratory (GLERL) was established in 1974 at Ann Arbor, Michigan to provide a focus for NOAA's research in that region. Approximately 40% of GLERL's budget is related to lake pollution research. Our budget for FY83 proposes to close this Laboratory. While NOAA recognizes the importance of the Great Lakes to the nation and the need to continue research, the program at GLERL is more regional in nature than those at the other laboratories. Since state and local governments have most of the management responsibility for the Great Lake resources, we believe they should support the relevant research activities.

Ocean data

As I mentioned earlier, EDIS conducts a number of activities dealing with ocean data. Section 8 of the National Ocean Pollution Planning Act of 1978 requires the Administrator of NOAA to ensure that findings and information from Federally sponsored ocean pollution programs be disseminated in a timely manner and in useful forms. EDIS has been delegated this responsibility.

During fiscal year 1983, EDIS will complete a detailed design for an operational coean-pollution data and information dissemination system. The long-term objective is to develop an operating Ocean Pollution Data and Information Network (OPDIN) by March, 1985. Through OPDIN, EDIS will increase the value and use of national marine data holdings and provide support for marine resource assessments and for offshore oil, gas and mineral development.

Marine data products and services annually are provided to tens of thousands of users in commerce, industry, science and engineering, Federal, State and local governments, and the general public by EDIS. To provide these products and services, EDIS acquires, processes, and disseminates global environmental data from domestic and foreign sources. EDIS data bases are shared with the military for national defense applications.

EDIS is the national focal point for historical data in oceanography, marine geology and geophysics, and marine meteorology. Data are made available to users through three data centers: the National Oceanographic Data Center (NODC), the National Geophysical and Solar-Terrestrial Data Center (NGSDC), and the National Climatic Center (NCC). NGSDC provides marine geology/geophysics data to offshore petroleum exploration operators and other users. NCC has just implemented a new file structure and quality control system for its marine data file to provide quicker access and higher quality data to users.

NCC's Satellite Data Service Division (SDSD) provides worldwide satellite cloud photos and analyses, infrared imagery and data, and computer-derived products from the various families of operational and experimental environmental satellites. These data concern clouds, weather systems, the Gulf Stream, ocean currents, sea ice, and tropical cyclones. SDSD is collocated with NOAA's National Earth Satellite Service.

Three important marine data-bases developed by EDIS involve the Ocean Thermal Energy Conversion program (OTEC), distribution of manganese nodules and the Outer Continental Shelf Environmental Assessment Program (OCSEAP).

In addition, the EDIS Environmental Science Information Center (ESIC) provides computer-based, technical literature searches of approximately 200 commercial and Federal bibliographic data bases, many in the marine area.

Another activity of EDIS involves the National Strategic Petroleum Reserve system of storage cavities in natural underground salt domes in the western Gulf Coast area. The potential ecological effects of the planned disposal of huge volumes of saturated brine into gulf waters were analyzed in a NOAA project involving the National Ocean Survey and the National Marine Fisheries Service led by EDIS for the Department of Energy. These studies played a part in decisions regarding the location of storage sites and the design of the brine disposal systems. We estblished that disposal of salt-dome brine into Gulf of Mexico waters should have a relatively minor impact upon the marine environment. The impact of brine disposal is of prime concern to the commercial fishing industry. The verification of EDIS conclusions by actual field observations enhances the credibility of impact studies for other sites and should speed up the filling of the Reserve.

Ship support

In support of many of NOAA's services and much of our ocean research, NOAA's National Ocean Survey (NOS) owns and operates a fleet of 22 major vessels, ranging in length from 86 to 303 fleet, which carry out survey, observation, measurement and sampling in support of marine programs in nautical charting, environmental baseline studies, ocean dumping, basic ocean research and fisheries assessment. A total of 4,314 days-at-sea will be provided in fiscal year 1982.

Major bases are maintained at the Atlantic Marine Center in Norfolk, Virginia, and the Pacific Marine Center in Seattle, Washington. Subordinate ship-support facilities are maintained at Woods Hole, Massachusetts; La Jolla, California; Honolulu, Hawaii; Florida; Pascagoula, Mississippi; and Juneau, Alaska.

This program also manages the training and recertification of 300 active and 130 inactive divers, tests and evaluates diving equipment, and trains recompression chamber operators and emergency medical technician divers. NOAA owns and oerates two shore-based and six mobile recompression chambers and support equipment.

Results of ship operations achieve a better understanding of the physical, chemical, biological and geological characteristics and behavior of the oceans and the seafloor, and the ocean atmosphere interface.

Ocean technology and data buoys

NOAA's Ocean Technology and Engineering Services (OTES) program provides services for NOAA's ocean programs and reimbursable support to other Federal agencies when it is ascertained that the programmatic content of the work is mutually beneficial.

NOAA's ocean data-base and ocean information products are derived from measurements made in a harsh environment. Cost-effective acquisition of these data requires the application of high technology and sound engineering practices.

Rapid, large-area measurements of pollutants in surficial sediments were required. A sediment sampling instrument towed from a ship was demonstrated. It was shown that this new technique is far more effective than the grabsample method presently used by drifting ships. A new ocean current measuring technique is in the final development stages. This new measuring system utilizes acoustic transmission coupled with a doppler technique and can be used to measure currents from a moving ship or from a location at the bottom of the water column. This system eliminated data errors inherent in present instruments and, since a surface manifestation (buoy) is not required, instrument survivability is significantly better. A new water level system for measuring tidal and nontidal phenomena is under development. The existing system is old and is relatively unreliable. Techniques derived from new technologies form the basis for the design and development of the new instrument, resulting in increased cost-effectiveness and the acquisition of more accurate data under dynamic wave and current conditions.

The present offshore shipboard depth-measuring system samples very little of the bottom with its single narrow beam. A multibeam-swath system, under development, will increase the bottom coverage thereby increasing the probability of detecting bottom conditions hazardous to navigation.

A transition engineering program in conjunction with NOAA's Wave Propagation Laboratory will provide a new prototype portable radar system to give ocean surface current data in near real-time over large ocean areas. This information is required for coastal dynamic studies, water-mass transport studies, marine safety and boat traffic control.

We began activities in fiscal year 1981 to provide techniques to measure the most important components of ocean-heat transport off Florida. These techniques will be employed during the Sub-Tropical Atlantic Climate Study developed jointly with Atlantic Oceanographic and Meteorological Laboratories. The information provided is an initial step in the development of a global ocean monitoring system in support of the U.S. Climate Program.

NOAA has been managing the Department of Energy's Ocean Thermal Energy Conversion program through a cost-reimbursable interagency agreement. Over the last 6 years research and development have averaged about $3.0 million per year with 85 percent done by industry. This program demonstrates the technical and economic feasibility of a pilot 40-megawatt electric energy source with minimum environmental impact.

The National Data Buoy Office (NDBO) and the National Weather Service (NWS) work together to collect and disseminate data about weather and ocean conditions. NWS provides warnings and forecasts to the public for coastal waters up to 60 miles from shore, offshore out to about 250 miles and, by international agreement, certain areas of the high seas. Nineteen coastal Weather Service Forecast Offices have marine warning and forecast responsibilities. They receive and use observations from automatic weather stations, cooperative observers along the coast, offshore platforms, ships, satellites, radar and instrumented buoys, all of which provide the critical information needed to prepare public warnings and forecasts for coastal, offshore and pelagic areas.

Since June, 1972, NWS forecasters have used observations from moored databuoys deployed in various offshore and ocean regions. All data reports are collected and transmitted by GOES satellites to the National Meteorological Center where they are put on domestic circuits to our forecast offices.

Specifically, the data buoy observations are used by the NWS in the following ways:

1. To provide observations in data-sparse areas, thereby supplementing and enhancing observational information from other sources (satellites, oil platforms, co-op ship reports, etc.) needed for early warnings of storms likely to threaten public and maritime activities;
2. Provide a basis for oceanic climatology, both atmospheric and hydrospheric;
3. Provide time-continuous and fixed-point observations for numerical models and product preparation.
4. Provide data for verification of guidance and routing of warnings and forecasts, and
5. Provide "ground truth" for new remote-sensing technology.

The NWS and NDBO are evaluating the use of drifting buoys in our warning and forecast systems. Drifting buoys used in the recent Storm Transfer and Response Experiment (STREX) in the North Pacific in the 1980–81 winter provided real-time data to forecasters. Drifting buoys appear to be a relatively inexpensive way of gathering sea-surface temperatures, pressure, current and wind information from data-sparse oceanic areas too distant for moored buoys. They report via polar orbiting satellites.

As for the future, NWS will use an oceanic data base with a mix of coastal and buoy systems, blended with satellites, data from offshore oil platforms and cooperative ships—all reporting in standard formats permitting efficient and rapid data processing.

In fiscal year 1983, NOAA proposes a $1.0M reduction in operation and maintenance of data buoys. This will result in the removal of 4 moored buoys from the present 14-location network.

We believe that the removal of the four buoys in the areas from which we receive a substantial number of ship observations will minimize the impact on our ability to continue to provide adequate marine warnings and forecasts.

OCEAN MANAGEMENT

In the general area we call ocean management, NOAA is involved in (1) coastal zone management, including marine and estuarine sanctuaries; (2) OTEC; and (3) deep seabed mining.

Coastal zone management

The Coastal Zone Management Act (CZMA) of 1972, authorized the first nationwide program for the wise use and protection of our coastal lands and waters. It provides funds to state governments to help them establish coastal zone management programs that meet Federal objectives. Amendments passed in 1976 and 1978 added the Coastal Energy Impact Program (CEIP) designed to assist states financially in planning for and mitigating the impacts of off-shore oil and gas development and other coastal energy activity.

The 1980 Amendments to CZMA identified nine elements of national interest in which states are required to make program improvements, namely: Protection of natural resources; management of coastal development to avoid construction in fragile or hazardous areas; priority consideration for coastal-dependent users and energy-facility siting; public shorefront access; assistance in redevelopment of urban waterfronts and ports; coordination and simplification of governmental procedures to ensure expedited governmental decision-making; consultation and coordination with Federal agencies; public participation in coastal decision-making; and comprehensive planning, conservation and management of living marine resources.

There are two basic incentives for state participation in the program. The first is financial assistance. Grants on an 80 percent Federal, 20 percent state-matching basis were provided to each eligible coastal state or territory for up to four years for the purpose of developing its coastal management program. The first grant was issued in 1974. Since then, all 35 coastal states and territories have availed themselves of this assistance to pursue the policy objectives of the Act, including better protection of natural coastal resources, more thoughtful development procedures, easier recreational access to the coasts, and better coordination of government activities.

The states are eligible for program administration grants. Federal approval of a state program triggers the second important incentive in the Act—the consistency provision—which requires that all direct Federal activities and federally licensed or permitted activities within a state's coastal zone be consistent with the state's approved coastal-zone management plan.

The national CZM program is completing the transition from development to implementation. Twenty-six coastal states, with 87 percent of the U.S. coastline, have Federally-approved CZM programs. Two other states, New Hampshire and New York, are aiming for approval in fiscal year 1982.

The Office of Coastal Zone Management is phasing down both CZM and CEIP programs in fiscal year 1982 and fiscal year 1983. The office is working with each coastal state agency to plan a phase-down strategy identifying the legal, financial and personnel elements necessary to maintain Federal approvability. Final grants will be awarded in fiscal year 1982 to implement these strategies. The ultimate amount of the grants will depend on the outcome of proposed recissions in fiscal year 1982 of $12 million in CZM funds and $7 million in CEIP funds, which were transmitted to the Congress in February, 1982. The proposed recissions would leave $21 million for phasing down coastal-zone management in 26 coastal states and result in zero funding for CEIP this fiscal year. It appears that the states, in large part, will be prepared to assume financial responsibility for coastal management after the termination of Federal assistance.

After the fiscal year 1982–83 phasedown, the office will continue to service coastal states. Statutorily, we must evaluate programs to certify continued Federal approvability, review implementation of consistency provisions of the Act, and amend programs as necessary to encourage improvements and orderly grant administration. We will also provide technical assistance and Federal-agency liaison on coastal management issues such as Federal consistency, and Federal and state dredge and fill procedures, monitoring and enforcement.

OCZM is the only agency we know of in the world administering a national coastal management program. In the future we will continue to be responsive to the service requirements of coastal states and other coastal constituents. It is appropriate for the office to transfer information to states and local governments upon request. The office will develop and maintain the staff capability and data systems necessary to respond to technical assistance requests on a cost-efficient basis.

Sanctuary programs

The National Marine Sanctuary Program authorized under title III of the Marine Protection, Research, and Sanctuaries Act of 1972 protects both marine and Great Lakes waters. The Secretary of Commerce has designated six sanctuaries in order to protect or restore their recreational, ecological, and aesthetic values. While not statutorily linked to the CZMA, the Program supports CZM by providing comprehensive natural resource management of special marine areas, including environmental protection, research, and assessment of sanctuary resources and educational efforts.

All six sanctuaries have onsite managers. One sanctuary has a final Management Plan and of the remaining five, four have drafts completed, with finals due in September, 1982. Research is ongoing in five of these sanctuaries and all have interpretive programs underway or planned for this fiscal year. Four active candidates for sanctuary designation are currently undergoing evaluation. A Program Development Plan (PDP) for sanctuaries is also being implemented. The PDP outlines program philosophy, proposes a revised site-identification and selection process, and focuses on resource interpretation and research instead of regulation. The new site-evaluation process should eliminate inappropriate sites such as those previously nominated solely to obstruct development.

The program was reauthorized in fiscal year 1981 for two years at $2.235 million per year. The NOAA budget requests a like amount for fiscal year 1983.

We plan to complete the site-evaluation process so that all future sites will be sure to rest on a sound resource base. We will focus our attention on resource interpretation and management-related research. These emphases will improve site management, enhance public understanding of marine resources and promote conservation and wise use. It will also insure that sanctuary research data are available in usable formats to public and private sectors.

As the more valuable sites are added to the national system, emphasis will shift from addition of new sites toward comprehensive management of what we already have. Interpretation and education, integrated with well-conceived research, are vital to site survival and public acceptance of resource conservation.

Section 315 of the CZMA establishes the National Estuarine Sanctuary Program, which provides 50 percent matching grants to states to acquire and manage estuarine sites for purposes of protection, ecological research and education. Twelve estuarine sanctuaries have been established since 1974. Four have management plans in place and seven draft management plans will be submitted by the end of fiscal year 1982.

Six national estuarine sanctuaries employ full-time managers who coordinate the research and education programs. Managers will be appointed at four additional sites by the end of fiscal year 1982. Four of these sites have interpretive visitor centers. Two sites have visitor centers under construction and five are planned for the future. Eight of the sanctuaries support ongoing research and education activities and the three sites established in September, 1981, will be implementing their research and education programs by the end of 1982. Three sites are being evaluated for establishment in fiscal year 1982. The NOAA proposes funding the estuarine sanctuary program at $2 million for fiscal year 1982 and $1.28 million for fiscal year 1983.

We need to develop a research and education network to facilitate information exchange among sites and with the general public. This will prevent duplicative research and enhance public understanding of the value of estuarine systems. We also want to develop regulations for the program implementing current policies.

A program development plan (PDP) outlining the history, mission and objectives of the program will be prepared. The PDP will also contain criteria for site selection, writing management plans and implementing research-education programs. This document will serve as a manual for Federal/states offices and interested persons, and will provide a clear understanding of program philosophy.

Additional sites should be added to the system in order that the system become truly representatives of the Nation's estuaries. As the national system is completed, the program focus will move from acquistion to management. Operations research, interpretation and educational activities conducted on-site will be important to enhance public awareness of the need for conservation of estuarine systems.

Ocean thermal energy conversion (OTEC)

The recently enacted Ocean Thermal Energy Conversion Act of 1980 (P.L. 96-320) assigned NOAA responsibility for establishing a legal regime which will encourage the development of a commercial ocean thermal energy conversion—or OTEC—industry.

NOAA has now established the framework for an OTEC Program.

Pursuant to section 102(a) of the Act, on July 31, 1981, prior to the deadline called for in the Act, NOAA issued its final regulations for commercial OTEC licenses. The regulations establish a legal regime for issuance of licenses for construction and operation of commercial OTEC facilities and plantships. At the same time, although it was not required by the Act, NOAA also issued an environmental-impact statement. NOAA also published a technical guidance document to assist those who will be preparing license applications and supporting documents. In March of 1981, NOAA submitted its first annual report to Congress on the implementation of the OTEC Act.

Under section 107 of the Act, NOAA prepared a draft plan in January, 1981, assessing environmental effects of commercial OTEC operations. The review process is nearly complete and we expect to submit a final plan to Congress soon.

NOAA's implementation of its responsibilities under the OTEC Act has been carried out in full consultation with private industry, a large number of Federal and state agencies and public interest groups. This dialogue has been very productive, and the good working relationships we have established will be invaluable as the OTEC program moves forward. NOAA has set up an experiment in "one-stop" licensing process, which has integrated at least 24 separate regulatory actions by NOAA and eight other Federal, state and local agencies. NOAA will be responsible as the lead agency for the preparation of comprehensive draft and final environmental impact statements covering the concerns of all these agencies.

To make this procedure work NOAA is:

Preparing a manual describing the major elements of the many regulatory/permitting programs (both Federal and state) in OTEC licensing.

Developing a management and scheduling system for the licensing process to keep track of the status of each agency's proceedings.

Discussing permit procedures and timetables with other Federal agencies in order to conduct a single set of consolidated hearings, and to establish a timetable for completion of the entire licensing process within a year.

Initiating analysis of OTEC plant seawater-intake and output flow-fields to enable NOAA to predict the extent to which one OTEC plant would affect the operation of another OTEC plant nearby.

Initiating analysis of the potential impact of OTEC plant operations on nearby commercial and recreational fishing industries, a controversial issue.

Initiating procedures for providing Commerce Department assistance to U.S. companies negotiating with other countries for export sale of OTEC plants.

Deep seabed mining

The third ocean management activity of NOAA is the program authorized by the Deep Seabed Hard Mineral Resources Act (P.L. 96-282). This law, along with the two laws dealing with ocean pollution, is up for reauthorization this year. We will present extensive comments on this program later in this statement.

OCEAN RESEARCH

Environmental research

The Environmental Research Laboratories (ERL) conduct basic and applied research to develop scientific capability to predict the state of oceanic and Great Lakes ecosystems, to evaluate the response of these ecosystems to human-reduced stresses, and to develop a quantitative assessment of marine pollution problems as a scientific basis for alternative management and regulation strategies. ERL conducts research in Atlantic, Pacific and Great Lakes waters on the sources and characteristics of human-induced contaminants and their passage through marine ecosystems. The contaminants of primary interest are synthetic organics, heavy metals and hydrocarbon fractions. Program emphasis in all regions is on physical and geochemical transport processes.

Research on the west coast has been conducted primarily in Pacific northwest coastal and estuarine waters and on the Alaskan continental shelf. In the latter case this research has been largely in support of and funded by the BLM/NOAA supported Outer Continental Shelf Environmental Assessment Program (OCSEAP). Because of the important role of sediments, especially in estuarine environments, the West Coast effort has studied the process controlling movements of sediments and the interaction between pollutants and particulate materials.

ERL has a two-part mission in the Great Lakes: to conduct research directed toward a better understanding of environmental processes in the Great Lakes and their basins, and to assist in the solution of problems in resource management, water-related activities and environmental services. The multi-disciplinary research program reflects the need for specific information about the Great Lakes, although research findings such as ecosystems and contaminants transport models have broader applicability. Studies of selected chemical and biological properties are conducted to improve our understanding of ecological trends in the lakes and to manage waste, water supplies and fisheries. Models to show the eutrophication process and transport and fate of contaminants as a function of human input to the lakes are developed for wastewater management and regulation policies. Information on the lake water levels and connecting channel flows is obtained for purposes associated with erosion control, transportation, recreation, and power generation. A major program on Great Lakes circulation forms the necessary basis of other research efforts.

ERL conducts basic and applied research on improved warnings and forecasts of hazardous marine conditions and on improvements in economic efficiency, particularly fuel conservation. ERL scientists work closely with colleagues from the National Weather Service and the National Ocean Survey in defining research needs and assuring that research findings are made available to operational elements of NOAA. Research subjects include coastal winds and waves, storm surges, arctic and Great Lake ice distribution and dynamics, tsunami propagation and run-up, and coastal upwelling.

ERL conducts ocean services research in Atlantic and Gulf of Mexico through its Atlantic Oceanographic and Meteorological Laboratories (AOML). The primary objective of this research is to improve forecasting and hindcasting capabilities through improved understanding of physical processes in the transfer of momentums from the atmosphere to the oceans. AOML is also developing improved storms surge models needed for purposes of disaster warning design data, building codes, insurance rates and for establishing the environmental impact of coastal zone activities.

In the Pacific Ocean marine meteorology is a major ERL research area, conducted primarily by the Pacific Marine Environmental Laboratory (PMEL). The goal is to map the mesoscale wind fields in coastal and inshore waters of the West Coast, including Alaska and Hawaii; to understand the physical processes that give rise to local variations in wind fields; and to provide NOAA units, particularly the NWS forecasting offices and ocean service units, with improved tools for the forecasting of winds. Research on wind and waves by PMEL presently focusses on wave conditions at the mouth of the Columbia River, a region having a documented history of boating accidents and loss of life resulting from severe waves.

ERL is studying physical processes associated with tsunamis and is determining tsunami hazards for zoning purposes. Specifically, instrumentation has been developed to measure tsunamis accurately in the open ocean, thereby providing observational guidance for Tsunami Warning Centers.

Recent expansion of the Bering Sea fisheries to year-round operation, the potential development of offshore energy resources, and the growth of shipping through the Bering Sea to the North Slope have emphasized the need for more accurate forecasts of pack ice location, condition velocity and direction of movement. ERL has recently initiated research on arctic ice processes, the goal of which is to provide operational units of NOAA with improved capability to forecast sea ice conditions and the extent of pack ice in the eastern Bering Sea.

National sea grant college program

The National Sea Grant College Program has been one of the primary suppliers of services and research support to the ocean-user community. There are nearly 175 academic institutions and numerous government agencies and private companies, now involved in Sea Grant activities in every coastal and Great Lakes state and in some territories. Sixteen Sea Grant colleges have been formally designated by the Secretary. These and other Sea Grant institutions conduct broad programs of research, education and advisory service to promote the wise use of our marine resources. Sea Grant's Marine Advisory Service (MAS) provides information for fishermen, shippers, ocean-energy suppliers, marine miners, marina operators, recreationists, coastal managers, students, and the public. The MAS employs some 300 agents and specialists in 30 states, Puerto Rico and Guam.

Sea Grant researchers have developed information ranging from the development of new products and techniques for commercial development to providing information on environmental contaminants to regulatory agencies, industry, and the public, and assessing fish stocks for fishermen and management agencies. The Federal budget for the Sea Grant Program in fiscal year 1982 is $35 million. We are proposing the termination of Federal support for the Sea Grant Program in fiscal year 1983; we believe that the program's success in meeting local needs and in attracting more than the required matching contribution indicates that local and state entities can provide the required funding.

Manned underwater research support

To satisfy NOAA's undersea ocean-related mission responsibilities, NOAA's Undersea Research Program (NURP) provides the science community with an ensemble of undersea facilities and capabilities including manned saturation habitats, shallow and deepwater manned submersibles, remotely operated vehicles, and surface-supported diving systems. Of primary importance are the regional undersea research program and submersible scientific cruises. This regional program offers the marine scientist research opportunities—in tropical island waters, on a mid-Pacific archipelago, amidst temperate kelp forests and on the Atlantic Continental Shelf—sponsored through by universities. Submersible cruises are held yearly both on U.S. east and west coasts using shallow-water submersibles in addition to the yearly deepwater DSRV ALVIN cruise.

A major scientific activity at the regional undersea facility at the University of Hawaii was conducted last summer at the Eniwetok Atoll in the Marshall Islands, a joint effort among NOAA, DOE and the Defense Mapping Agency (DMA) investigaing the effects of radionuclides upon the marine ecosystem. The submersible activities both within and outside the deep lagoon included dome emplacements, examination of large nuclear craters and benthic communities and collection of radionclide samples of radionuclides.

In support of these activities, both operationally and in the development of specific programs, NURP's fiscal year 1982 base budget was $3,655M. However, because this program is primarily a regionalized activity, it is slated for termination in fiscal year 1983. Those entities that have been most involved, primarily universities, can seek funds other Federal, state, or local agencies to such projects.

Mapping, charting and geodesy

Traditionally, NOAA's National Ocean Survey (NOS) conducts programs which provide maps, charts and information that serve merchant shipping aviation, and all users active in coastal and offshore areas. In addition, geodetic services assist government operations involving space and defense as well as land management. NOS programs include: (1) nautical charts and marine navigation data for 2.5 million square miles of ocean area around the U.S.; (2) aeronautical charts for U.S. national airspace systems; and (3) a national geodetic reference system which is the basis for determining latitude, longitude, and elevation on the solid earth, in the oceans, and in space.

Mapping and charting

The Marine Charting Program provides nautical charts, marine navigation data and coastal and seafloor maps. The program maintains a suite of 980 nautical charts, 9 Coast Pilot volumes containing marine navigation data in text and pictorial form, 550 bathymetric and coastal maps, 25,000 hydrographic and topographic survey sheets and nearly 500,000 aerial photographs covering 94,000 miles of the Nation's shoreline.

The four basic elements of the program are hydrographic surveys, seafloor mapping, coastal mapping, and chart and map production. Hydrographic surveys are carried out by 8 NOAA survey ships to determine bottom configuration and depth, and the location of physical obstructions and aids to navigation. Two NOAA ships are used for deep-ocean mapping, and their surveys allow us to upgrade critical data. The coastal mapping activity carries out aerial photographic surveys and compiles shoreline maps for the location of nearshore and inshore features and for hydrographic survey position control.

Charts, seafloor maps and coastal data are basic tools for navigation, ocean operations and resources management. They directly support the growth, efficiency and safety of all marine and coastal operations. A significant percentage of chart production goes to the military and other national security agencies. More than 200,000 merchant ships, offshore platforms, work boats, commercial fishing vessels and dredges operating in the 200 mile economic zone depend on charts and maps. Several million recreational boaters and fisherman use NOAA charts. State agencies and the private sector depend on charts and maps for hazards education, developing land-use policy, emergency evacuation procedures and resources development. Last year over 2.3 million charts and maps were issued.

To promote the safety, efficiency and growth of the Nation's marine activities, the Federal Government has a clear and irrefragable responsibility to maintain an accurate, standardized, national marine navigational data-base, one which is disseminated to user, through 980 nautical charts and 9 Coast Pilot volumes.

Taking advantage of new computer technologies, NOAA is completing an automated, nautical charting data-base which could result in new ways of delivering chart information to the user. Although traditional printed charts and publications will continue to meet the needs of many, there is a growing interest in digital chart data and electronic charts. Each user could eventually access the information directly and tailor chart products, within certain standards, to their specific needs. We are now revitalizing contacts users and expect over the next decade, through cost sharing agreements, to assist these clients in developing the capability to directly access and manipulate data from the base.

Aeronautical charting

The Aeronautical Charting program maintains and distributes over 7,700 individual charts and other information covering U.S. airspace and certain international airways in three basic categories:

(1) Visual Charts provide information and instruction to pilots flying under Visual Flight Rules (VFR); they show topography, man-made obstructions, airway definition, airports, radio facilities, hazards and regulations.

(2) Instrument Charts provide information and instructions to pilots flying under Instrument Flight Rules (IFR); they show interconnecting air routes, transition routes, airport approaches, procedures, radio facilities, technical data and regulations.

(3) Special charts for FAA including radar video-overlay charts, controller charts, airport obstruction charts, and airport obstruction data in digital form.

The program maintains the National Air Navigation Data Base which includes all data and information required to appear on aeronautical charts. At present, the file contains more than 6 million elements in 20 categories. The program also maintains, under FAA guidance, the airport obstruction file and data base.

Of the 7,700 different charts and information products in the active aeronautical chart data-base, about 6,000 are updated and issued every 56 days. This year more than 45,000 individual charts will be processed. About 15 percent of all charts undergo major revision and 70 percent minor revision each year. At prepresent 800 new charts are created annually, mostly instrument procedure charts.

Aeronautical charts are used by operators of private planes, corporate aircraft, commercial air carriers, military and other government aircraft, plus air traffic controllers, FAA management, military personnel, airport operations personnel and equipment manufacturers. This year there will be more 77 million aircraft take-offs and landings in the U.S. by 875,000 pilots. Today there are an estimated 215,000 private aircraft in the country.

Air navigation data and flight regulation information provided on aeronautical charts are critical in making decisions for flight planning, flight navigation and traffic control. This information directly influences the safety, efficiency and growth of U.S. aviation operations. Primary benefits are efficient utilization of the airspace for commerce, defense and pleasure. It is virtually impossible to operate an aircraft in the U.S. without reference to standard operational procedures and air navigation information. For interstate and intercontinental flight, procedures and information must be consistent for the entire country. The Federal Government is the only institution with the ability to establish and maintain a national air navigation information system which is uniform and serves all users.

In the next 10 years, the U.S. aviation industry is expected to expand more than 25 percent. By 1986, we expect one million active pilots and 92 million aircraft operations annually. We will need 12,000 charts by 1986—or more than 1,000 new charts each year. Since 85 percent of these charts will be issued every 56 days, we must be able to update and process more than 55,000 charts annually. FAA is proposing major changes in operation and control of the national airspace. A new generation of faster computers will be used for ground based air-traffic control. All information in the air navigation data-based will be digitized. We must be prepared to respond to the requirements for access to the data in real-time and for the production of electronic charts.

For fiscal year 1983, we are requesting $53.5 million for mapping, charting and geodetic programs of the NOS. This level of support will maintain the priority services provided by NOS in all its operations. Budget savings are planned through deferring lower priority activities and improving service productivity through automation of data acquisition and product preparation activities.

To offset some of the appropriated funds for these programs, we are proposing, through draft legislation, higher fees for aeronautical and nautical charts. In fiscal year 1983, we would increase fees to recover about 35 percent of the gap between present fees and full cost-recovery fees, which is our goal in fiscal year 1985. We believe it is entirely appropriate that users of charts should pay for chart production rather than ask general tax-paying public to do so.

Geodesy

Geodesy is that branch of applied mathematics which determines the precise position of features of the earth's surface, the size and shape of the earth, and variations in its gravitational field and rotational characteristics. NOAA maintains and is improving two geodetic control networks that cover the Nation. The National Geodetic Horizontal Control Network consists of 250,000 points interconnected by geodetic field observations where precise latitude and longitude is known for each point. The Vertical Control Network includes 500,000 points, again interconnected by geodetic observations, where a precise elevation above or below a specified sea level can be demonstrated. At present, program activity is concentrated on completing, through field observation and computation, major network readjustments to improve control-point accuracy and reliability. The precise data on each monumented control point are available in an automated data-base. In addition to maintaining and expanding the two networks, the program collects and makes available data on the complex motions of the earth's rotational axis, earth rotation time, earth gravity, and limited data on local crustal subsidence, uplift and lateral movement. Finally, the program provides national leadership on procedures, standards and techniques for surveying and other geodetic measurements, and on processing complex geodetic computations.

Geodetic data is the foundation for all mapping and charting. Boundaries of 120 million tax-assessed parcels and millions of acres of government land are described by survey data tied to the National Geodetic Reference System. Major construction requires geodetic survey data for planning, operation and recording positional details of completed projects. Geodetic data is used to locate space and defense systems, position launch-sites, orient rockets and weapons, and track the path of missiles and satellites.

The geodetic networks are a national asset which provide basic information for every activity that requires reference to a precise position and elevation on the earth's surface. The need for this reference system, and the Federal government's responsibility for maintaining and improving it, is manifest.

Population growth and migration to the sun belt and coastal areas have created a demand for geodetic control points in here-to-fore undeveloped areas. In 20 years, the number of tax-assessed land parcels has doubled to 120 million, and eight million parcels are transferred each year. Local communities, counties and States and Federal agencies have had to abandon local data and isolated reference systems and integrate their surveys into the National Network to avoid costly ambiguity. With such rapid growth and relocation, 125,000 control points must be added to reference networks by 1990.

To meet this demand, NOAA's Geodesy Program will concentrate efforts in two areas over the next decade. First, techologies developed by the National Aeronautics and Space Administration and Department of Defense will be applied to NOAA's geodetic data acquisition and processing activities to complete and maintain the network. These technologies will increase productivity by a factor of nearly 20 to 1. The second item will be the development of several cost-sharing agreements with private, state and local entities to transfer technologies and services to users of the geodetic data, while NOAA continues to maintain the National Geodetic Network and its associated data-base.

REAUTHORIZATIONS

Marine Protection, Research, and Sanctuaries Act

I would like to focus on our program carried out pursuant to title II of the Marine Protection, Research, and Sanctuaries Act. We recommend reauthorization of this Act.

The Ocean Dumping Program was established by NOAA in 1976 to implement section 201 of the Act. It is currently funded at $2.470 million and its purpose is to improve understanding of and alert regulatory and resource manages at all levels of Government to the environmental consequences of ocean dumping. The program consists of specific waste and dumpsite investigation and a complementary laboratory effort.

In the period fiscal year 1980–82, we tried primarily to get a comprehensive view of ocean dumping and its relationship to other pollutant sources, including studies of biota in the immediate vicinity of sewage sludge, industrial waste and dredged-material dumpsites.

Sewage sludge-dumping studies were conducted in the New York Bight and on the discontinued site in Philadelphia. In the New York Bight, some of our efforts were focussed on syntheizing the conclusions and findings of previous research at the 12-mile sewage sludge site. Our current findings continue to show that sludge dumping alters benthic communities in an area some 240Km around the dumpsite and effects water quality over small time and space scales. Evidence is inconclusive that dumping is responsible for swimming-associated illness at coastal beaches. We have, however, found that a significant fraction of the bacteria, protozoa and viruses reaching the sediments of the inner Bight is probably derived from sewage sludge.

Use of the Philadelphia dumpsites was discountinued in late 1980. Our data show that rock crabs no longer show evidence of gill blackening, and fecal coliform counts in sediments have declined to zero. However, longer-lived pathogenic amoebae and human intestinal viruses were found in sediments some six months after dumping stopped.

We continued major efforts analyze industrial waste dumping at the 106-mile site and at a site north of Puerto Rico, emphasizing long-range dilution and dispersion characteristics and studies of low-level and chronic effects. Evaluation reports were issued on disposal at the 106-mile site and at a discontinued site in the Gulf of Mexico.

With regard to deepwater dumpsites, we found that wastes are dispersed over wide areas, do not accumulate on the seafloor, and do not harm planktonic, except within an area of about 50km^2 during the first day after dumping. One unanswered question is whether disposal tonages could be increased and still continue to produce minimal effects.

Our studies of dredged-material disposal emphasized basic questions of how to minimize impacts. Such disposal in the marine environment will continue in U.S. coastal regions for the foreseeable future. We examined mechanisms by which contaminant transfer over long periods of time from sediments to water and organisms, might be minimized, obviated or prevented. We are paying special attention to the New York Bight, where sediments are particularly contaminated. We are investigating the feasiblity, for example, of putting contaminated material into borrow pits and capping the material with clean sand.

Funding for the Ocean Dumping Program is included in the NOAA budget line-item "Regional Projects and Ocean Dumping Research," which is among the targets for proposed cuts in our fiscal year 1983 budget. Nevertheless, we plan to continue with the more critical elements of the program using funds from the section 202 program and funds for implementing section 6 (Financial Assistance Program) of the National Ocean Pollution Planning Act (P.L. 95-273). Inasmuch as the Federal Plan for Ocean Pollution assigns high priority to continued research, support of our Ocean Dumping Program from these sources would be well within the intent of the legislation.

The Long-Range Effects Research Program was established in fiscal year 1979 to carry out the mandate of section 202 of the Act, which is that NOAA maintain a comprehensive and continuing program of research on the possible longer-term impacts of human activities on the oceans. The current funding for this program is $4.835K and consists of an in-house segment and an extramural grants program. Investigations are focused on five problems: systhetic organic substances, processed petroleum products, metals, the role of organic particulates, and ecosystem dynamics. In-house, we have four Fisheris Service laboratories and three Environmental Research laboratories examining such matters as the role of organics in the transport of pollutants in the ocean, the long-term effects of oil on marine organisms, the cycling of toxic substances in the Great Lakes ecosystem, estuarine pollutant transport (Puget Sound) and the impact of estuarine degradation on striped bass in San Francisco Bay.

We request an authorization of $4.835K for implementing section 202 for fiscal year 1983 and such sums as may be necessary for fiscal year 1984.

National Ocean Pollution Planning Act

The National Ocean Pollution Planning Act of 1978, P.L. 95-273, calls for the establishment of a comprehensive, coordinated Federal program of research, development and monitoring of the marine environment, including the Great Lakes. We recommend reauthorization of this Act.

This Act directs the Administrator of NOAA, in consultation with the Director of the Office of Science and Technology Policy and other Federal officials:

To prepare and update biennially a comprehensive five-year plan for the overall Federal effort in ocean pollution research, development and monitoring.

To provide financial assistance for research and development, monitoring projects, or activities needed to meet priorities of the five-year plan if they are not being adequately addressed by any Federal instrumentality.

To prepare a detailed inventory of existing Federal programs.

To analyze the extent to which existing programs help us meet priorities.

To make recommendations for changes in the overall Federal effort where necessary.

To ensure that the results of Federal ocean-pollution research, development and monitoring programs are disseminated timely and in useful form to Federal and non-Federal user groups.

The Act also directs NOAA to establish a comprehensive, coordinated ocean-pollution research, development and monitoring program. To carry out the purposes of the Act, an interagency committee was chartered within the Office of the President's Science Advisor. The Interagency Committee on Ocean Pollution Research, Development and Monitoring is chaired by NOAA's Deputy Administrator and comprises senior representatives from eleven departments and independent agencies. Its mission is to establish priorities, identify gaps, promote cooperative research and endure external project evaluation. The Committee also seeks to avoid unnecessary duplication among Federal agencies and seeks more effective use of funds, personnel, vessels, facilities and equipment.

NOAA established the National Marine Pollution Program Office—called NMPPO—to provide a focal point for coordinating Federal efforts on a day-to-day basis. This office is responsible for updating the five-year plan and coordinating the implementation of plan recommendations. An interagency task group assigns NMPPO planning.

The first five-year plan was completed in the fall of 1979. Nearly 1,000 Federal projects were identified totalling approximately $165 million in fiscal year 1978. A revision of this plan is in the final stages of preparation and indicates approximately $171 million was devoted to marine pollution research activities in fiscal year 1981. The plan reviews the ocean uses that may contribute to marine pollution, summarizes our current efforts and identifies future needs.

NOAA had identified six agency goals responsive to the Act and to national needs:

1. To help guide national policy on marine pollution issues on the basis of reliable scientific information.

2. To provide leadership in planning and coordinating marine pollution research, development and monitoring activities; in preparing and synthesizing results from such activities; and in disseminating information timely and in useful formats.

3. To evaluate the marine environment as a source of renewable and non-renewable resources.

4. To support efforts to prevent or mitigate the effects of accidental releases of oil and hazardous materials into the marine enviroment.

5. To protect the integrity, productivity and aesthetic quality of the marine environment system from unacceptable ocean use practices and propose ways to enhance degraded areas.

6. To document and evaluate the status and trends of source loadings, ambient levels and biological accumulations of critical pollutants and their probable effects on the pollutants on the ecosystem and human welfare.

The most pressing marine pollution issues facing the nation at the present time and within the coming decade have been identified. We know what types of scientific information must be gathered to help decision-makers. The results of our studies have been synthesized in a form suitable for management.

The basis of this effort is an ocean-use model which determines the ecological consequences of man's ocean activity, balances socio-economic considerations against environmental impacts and assists management in validating regulatory or corrective measures. With this model, scientific assessments are provided at all decision levels of ocean-use management.

Section 8 of the National Ocean Pollution Planning Act calls upon the Administrator of NOAA to assure that the results and findings of ocean pollution research disseminated to all interested parties in a timely manner and in useful forms. As a result of our first Federal Plan we have established a Central Coordination and Referral Office within EDIS. Under the direction of this Office, we are implementing an Ocean Pollution Data and Information Network, which when fully operational, will make marine pollution data more readily available to government agencies and the private sector.

In summary, our experiences over the past several years have demonstrated that the Act provides a very effective framework for identifying important marine pollution problems, coordinating the Federal research, development, and monitoring response, and facilitating wise use of the seas. For this reason, the Administration supports a two-year reauthorization of the National Ocean Pollution Planning Act at a level of $3 million for fiscal year 1983 and such sums as may be necessary for fiscal year 1984

Deep Seabed Hard Mineral Resources Act

I am pleased to testify in support of the reauthorization of Public Law 96-283, the Deep Seabed Hard Mineral Resources Act, and on NOAA's implementation of the Act.

Signed into law on June 28, 1980, the Act established a legal structure to encourage U.S. companies to explore for and commercially recover deep seabed hard minerals and thus provide the U.S. with a stable source of strategic metals, pending the entry into force for the United States of an acceptable Law of the Sea Treaty. It authorizes the Administrator of NOAA to issue licenses to explore for deep seabed hard minerals and permits to mine the minerals commercially.

The Act also authorizes NOAA, in consultation with the Secretary of State and the heads of other departments and agencies, to designate as reciprocating states those which establish seabed mining programs compatible with the U.S. program and that recognize U.S. authorizations. Reciprocal arrangements ensure that each participating nation will recognize the rights of the others' mining enterprises.

NOAA has now met its obligations under Public Law 96-283 to establish the framework for our deep seabed mining program. On September 1981, NOAA issued its final regulations. The present regulations deal only with the exploration phase of seabed mining since NOAA determined that it would be premature to issue regulations for commercial recovery at this time.

Under section 109(c), NOAA issued a programmatic environmental impact statement on its seabed mining program. NOAA also published a technical guidance document to assist those who will prepare license applications and related reports. It provides guidance on such areas as environmental assessments and monitoring plans.

On June 24, 1981, NOAA submitted to Congress, pursuant to section 203 of the Act, a status report on the Law of the Sea negotiations relating to the establishment of a system for protection of interim investments.

In December of 1981, under section 309 of the Act, NOAA submitted to Congress its first biennial report on the administration of the Act. This report presented an introduction to NOAA's seabed mining program and summarized it's activities in implementing that program.

Finally, under section 109(a) of the Act, NOAA prepared a plan for carrying out a program of research and assessment of the environmental effects of mining exploration and commercial recovery. This was prepared in draft form in December 1980. A revision of the plan is nearly complete, and we expect to submit a final plan shortly.

We have established a legal framework to encourage the development of the new seabed mining industry in the United States, while assuring that such efforts preceed in a responsible and environmentally sound manner. We have structured our program to provide the necessary degree of certainty to the industry in the U.S., while also recognizing the need for flexibility in order to promote the development of deep seabed mining technology, and the usefulness of allowing miner initiative to develop techniques and systems compatible with the Act.

It may be useful to review some specific issues we have dealt with.

There is a requirement in the statute to assure that seabed miners do not unreasonably interfere with the interests of other nations in their exercise of their rights. In addressing this issue, NOAA will not require substantial information from a company in its application, but rather will refer primarily to the general principles of international law, in consultation with the State Department, as a basis for a determination.

The Act requires due regard for safety of life and property at sea. We concluded that the Coast Guard's vessel safety requirements and certification procedures are sufficient, so we incorporated them into our regulations.

There are also provisions in the statute to assure that seabed mining proceeds in an environmentally sound manner. We developed a programmatic environmental impact statement and we will prepare a site-specific environmental impact statement for each license.

In this regard, the mining industry in the early 1970's began urging NOAA to examine the environmental implications of manganese-nodule mining. This led to Project DOMES, the Deep Ocean Mining Environmental Study; environmental information was gathered in parallel with the industrial development of mining systems and metallurgical processes. As a result, NOAA's programmatic EIS is quite explicit about which activities probably will have no potential significant impact, and which will be the subject of particular attention in the future, e.g., destruction of benthos in and near the collector track, blanketing of benthic fauna and dilution of food supply away from the mine site, and surface pume effects on fish larvae.

We have concluded it is unnecessary to impose prior operational requirements on exploration activities. After a license is issued, however, there will be mechanisms for continued monitoring of the environmental effects of mining and for modifying the terms of a license in case of need. NOAA will be able to verify the status of the environs during mining systems tests, before any commercial mining takes place.

We have negotiated with other seabed mining nations an agreement under section 118 of the Act on such issues as reciprocal license reorganization, the resolution of conflicts among applicants and the harmonization of domestic licensing programs. This agreement is interim in nature, pending actuation of an acceptable Law of the Sea Treaty. Our intent is to obtain sigh-off of this agreement shortly.

Meanwhile, those countries with domestic seabed mining laws—the U.S., the Federal Republic of Germany, the United Kingdom, and France—have received applications from the pioneer consortia engaged in preliminary seabed mining before the existance of domestic law. NOAA has received applications from the four consortia with U.S. company participants; they will have a generic priority over applications filed subsequently. We currently are allowing the companies time to begin discussions to resolve privately any conflicts they may have before the various governments open up sea "coordinates" and commence formal processing of applications.

In summary, NOAA has set up its program under the Act and has reveived the initial U.S. exploration license applications. We are prepared to begin processing these applications and issuing licenses. We also intend to establish a commercial recovery regime which ultimately will provide a stable supply of strategic metals for the country.

In order for NOAA to continue these efforts, reauthorization of the Act is necessary. The Administration supports reauthorization of titles I, II, and III of the Act for Fiscal Years 1983, 1984 and 1985. Although we do not propose any amendments to the statute at this time, we are analyzing several issues that could lead to future legislative proposals, including possible commercial interest in polymetallic sulfides and the need to establish a legal regime to allow such minerals to be exploited, both off the U.S. coast and in international waters.

CONCLUSION

It was a pleasure for me to appear before the Committee today. I have tried to address all our ocean programs and activities and put them into an understandable perspective for you. In coordinating these programs we will explore our strengths and shore up areas of weakness. We are committed to do what we must do and still help the President and Secretary Baldrige reduce Federal spending. It is in that context that I hope you will review our programs. All of us in NOAA are aware of this Committee's interest and support of NOAA and we are prepared to continue working closely with you to meet our mutual objectives.

Thank you for this opportunity to testify; I welcome your questions.

QUESTIONS OF SENATOR RIEGLE AND THE ANSWERS THERETO

Question 1. It is my understanding that the rationale behind the decision to close the Great Lakes Lab was that the Lab is not essential to NOAA's mission. Would you explain exactly what is meant by "not essential to NOAA's mission"?

Answer. An evaluation of the Great Lakes Environmental Research Laboratory (GLERL) in comparison to other NOAA laboratories indicated that, in the context of NOAA's mission, GLERL was less critical than the others. NOAA's research mission is to conduct national programs to advance oceanic and atmospheric technology and science for the better management of the environment and the rational use of our natural resources. The program at GLERL is more regional in nature than those at the other NOAA laboratories; State and local governments have most of the management responsibility for the Great Lakes resources, and therefore should support any future research activities considered necessary.

Question 2. It is my understanding that NOAA opposes S. 1973, the "Great Lakes Protection Act", because it feels that the National Ocean Pollution Planning Act provides adequate mechanisms for accomplishing the improved coordination of Great Lakes pollution research sought by S. 1973. At the same time, however, NOAA is proposing to terminate the GLERL, a facility which conducts essential pollution contradictory nature of these actions?

Answer. NOAA has not commented on S. 1973, but did not submit official comments on the House version, H.R. 3600, last year. The NOAA position on H.R. 3600 was prepared in June 1981, prior to the decision to close the Great Lakes Environmental Research Laboratory. In addition, NOAA was not aware until the President's budget for 1983 was submitted to the Congress in February that the EPA and DOE Great Lakes research budgets were also reduced. The lead Federal agency for U.S. activities under the 1978 United States-Canada Great Lakes Water Quality Agreement is EPA through its Great Lakes National Program Office in Chicago. At the time NOAA commented on H.R. 3600, it was felt that between the EPA National Program Office and the Interagency Committee on Ocean Pollution, Development and Monitoring in Washington, D.C., coordination of research activities on the Great Lakes was well in hand.

Question 3. Did NOAA officials consult with other Federal agencies when deciding to close the Lab? If so, was NOAA aware that both DOE and EPA are proposing to eliminate Great Lakes research facilities?

Answer. The decision to close GLERL was made rather late in the budget cycle with no opportunity to consult with other Federal agencies. NOAA was not aware of the proposed closure of the EPA and DOE laboratories until after the fiscal year 1983 budget was submitted to the Congress.

Question 4. Who do you expect will provide future funding for Great Lakes research? The individual states are not in a position to pick up the tab—nor are the universities financially capable of funding and coordinating a comprehensive research program.

Answer. Each Great Lakes State is responsible for the proper management of its water resources, including Great Lakes waters off its shores extending to the international boundary line. Likewise, each state is responsible for conducting any research or monitoring required to carry out that resource-management responsibility.

Question 5. The pollution problems of the Great Lakes differ from those of our coastal water in three respects; (1) the Great Lakes are freshwater (and a source of drinking water for 23 million people), (2) the Great Lakes flush very slowly so pollutants introduced into the Lakes tend to remain there, and (3) the water quality of the Great Lakes is the subject of international agreements. Despite these differences, the National Marine Pollution Plan fails to make any special reference to the Great Lakes in its general recommendations. How can the planning process be changed to assure that the unique needs of the Great Lakes find adequate expression in future plans?

Answer. It is true that the second Federal Plan contains no recommendations per se regarding the marine pollution concerns of the nation's five regions, including the Great Lakes. Rather, for each region, the research, development, and monitoring needs were identified and arranged by priority in accordance with the results of the five regional conferences conducted in 1980. For the next version of the Federal Plan, we will consider including recommendations for action for each of the five regions.

Question 6. How do you feel Canada will react if these facilities are closed, especially in light of our treaty responsibilities?

Answer. In a diplomatic note dated March 30, 1982, the Canadian Government expressed its concern about the proposed reductions in research funding in the Great Lakes region and their impact on this country's ability to meet its commitments under the 1978 Great Lakes Water Quality Agreement.

Question 7. How much money will Canada be investing in Great Lakes research? How does that figure compare with NOAA's zero investment? Doesn't equity, as well as treaty obligations mandate U.S. financial support?

Answer. The Canadian expenditure for research on the Great Lakes, including both the federal and provincial levels, is estimated to be around $14 or $15 million. Equity and treaty obligations do indeed mandate U.S. financial support. NOAA and EPA, at the request of the Department of State preparatory to responding to the Canadian note, are now reviewing possible ways to continue the most essential research in the Great Lakes in the face of all of the proposed lab closures and budget reductions.

Question 8. Is NOAA aware of the renewed expression of concern from the Canadian government and its request for briefings as soon as possible on the implications of the proposed fiscal year 1983 budget cuts?

Answer. NOAA is aware of the concern of the Canadian Government and its request for briefing as soon as possible on the implications of the proposed fiscal year 1983 budget cuts.

Question 9. Did NOAA officials consult with the International Joint Commission—which is responsible under the 1978 Water Quality Agreement for monitoring the quality of the boundary waters of the Great Lakes, and who was requested by both governments to monitor compliance with the Agreement—before recommending the cuts?

Answer. NOAA did not consult with the IJC before these reductions were added to the agency's proposed fiscal year 1983 budget.

Question 10. The 1978 National Ocean Pollution Research and Development and Planing Act directs the Administrator to establish the priorities of national needs and problems which have been identified. Does the Administrator view the United States' obligations under the 1978 Agreement as relevant to the establishment of the priorities of pollution needs and problems of the Great Lakes?

Answer. The Administrator views the U.S. obligations under the 1978 Water Quality Agreement as particularly relevant to the establishment of the priorities of pollution needs and problems of the Great Lakes.

Question 11. How will the United States' obligations under the 1978 Agreement be discharged in the fiscal year ending September 30, 1983? Please state specifically which Federal or State agencies will do the work and which laboratories will be used. Is this information already provided in the National Marine Pollution Plan? If so, where?

Answer. NOAA believes that this question is more properly addressed to EPA for the reasons stated in the answer to the previous question. Discussions between EPA and NOAA indicate that possibility of approximately $1.5 million for Great Lakes water quality research during fiscal year 1983. As for where the work would be carried out, we cannot speak for EPA, but it is our intention to continue the important ongoing efforts on toxic substances and eutrophication.

This information is not provided in the second Federal Plan. The data used in preparing that Plan were collected in 1980 and early 1981 prior to the administration's efforts toward national economic recovery. At this time, the interagency planning group identified priority problem areas requiring continuing emphasis, reviewed agency problems objectives, milestones and budget targets, and recommended actions for improving the program. Since that time, a comprehensive review of Federal agency programs and budgets has been underway to reduce Federal spending. As policies toward economic recovery are implemented, the National Marine Pollution Program will change accordingly. Thus, the Plan does not contain information on agency programs and budgets after fiscal year 1981. A supplement to the plan will be prepared as revised agency programs and budgets become available.

Question 12. Does NOAA usually consider U.S. international obligations in its long and short term program planning?

Answer. NOAA usually considers U.S. international obligations in its program planning. The fiscal year 1983 budget review process and the decisions resulting therefrom were somewhat less dependent on agency planning than was the case in previous budget cycles.

Question 13. Were NOAA officials aware of the Great Lakes agreement with Canada when making the decision to eliminate the Great Lakes Environment Research Lab and were U.S. commitments under the Agreement taken into account?

Answer. NOAA officials were aware of the 1978 Great Lakes Water Quality Agreement when the decision to close the Ann Arbor laboratory was made.

Question 14. Under the Administration's proposed budget for fiscal year 1983 the Great Lakes Environmental Research Laboratory would be closed. The following questions deal with the implications of that closing.

Section 201 of the Marine Protection, Research, and Sanctuaries Act states, "The Secretary of Commerce, in coordination with the Secretary of the Department in which the Coast Guard is operating and with the Administrator shall . . . initiate a comprehensive and continuing program of monitoring and research regarding the effects of the dumping of material into ocean waters or other coastal waters where the tide ebbs and flows or into the Great Lakes or their connecting waters . . ."

With the proposed closing of the EPA's Large Lakes Research Station, the proposed reduction in funding for the EPA's Great Lakes National Program Office, and the proposed closing of the Great Lakes Environmental Research Laboratory, how will the Secretary be able to discharge his responsibilities toward the Great Lakes under this section?

Answer. Dumping of waste materials, as defined in the Marine Protection, Research, and Sanctuaries Act, does not take place in the U.S. portion of the Great Lakes or in their connecting channels. For this reason, NOAA has never conducted a program of research in the Great Lakes region pursuant to section 201 of that act.

Question 15. Mr. Robert C. McEwen, Chairman of the United States Section of the International Joint Commission, stated the following in his testimony before the House Subcommittee on Natural Resources, Agriculture Research, and Environment: "The 1978 Agreement expanded the earlier framework by adopting an ecosystem concept, placed new emphasis on the control of pollution of the Great Lakes from toxic substances, and stated the commitment of the parties to develop a coordinated surveillance program. Unfortunately, much of the information we need to make decisions is simply not available. Research, closely coordinated between the two Federal Governments and among the various jurisdictions must be a keystone for effective implementation of this framework. An enormous amount of research still needs to be conducted, and the commitment to this need must continue if we are to receive the data essential to making the intelligent judgments that over 30 million people in the Great Lakes Basin . . . deserve and indeed insist upon." Does NOAA share this view of the importance of research to the problem of Great Lakes water quality monitoring? If so where does the Agency expect to see the research done?

Answer. NOAA agrees that additional research is needed, particularly on the problems of toxic organic materials and eutrophication. Also, a coordinated surveillance program as called for under the Water Quality Agreement is essential for proper management of the Great Lakes. The economic difficulties now faced by this nation will require the deferment of many worthwhile government programs.

Question 16. If GLERL is closed, where does the Administration propose to find experts to serve on the US/CDA boards and committees dealing with:

(a) Phosphorous Load Reduction Negotiations under the GLWQA?

(b) Water levels and hydraulic date? (Key inputs to the implementation of the GLWAQ)

(c) Ice and ice booms in the Great Lakes? (An essential function for analyzing any environmental impacts from possible extension of the winter navigation season)

Answer. (a) Negotiations on phosphorus load allocations and compliance schedules were completed in May 1981. These agreements will be in effect for the foreseeable future. In the event the Water Quality Agreement is revised in 1983 or later, it can be presumed that our national interests will be well represented by the appropriate technical experts on the U.S. negotiating team.

(b) NOAA would not be able to participate in the work of the boards and committees dealing with water levels and hydrologic data. This responsibility would fall on the Army Corps of Engineers.

(c) The Corps of Engineers would have to supply technical experts to serve on joint boards concerned with winter ice on the Great Lakes.

Question 17. If GLERL is closed, who will carry out the necessary research so that the U.S. will know the source of the toxic pollutants found on both U.S. and Canadian sides of the Lakes?

Answer. As previously stated, NOAA plans to continue its ongoing studies of toxic organic materials in the Great Lakes through university contracts.

Question 18. The OTEC licensing responsibility was assigned by the Congress to NOAA in 1980 with almost no advance preparations by NOAA. Has NOAA been able to establish the background knowledge and expertise necessary to perform this responsibility?

Answer. The Ocean Thermal Energy Conversion Act of 1980, which assigned NOAA the OTEC licensing responsibility, became law in less than eight months after its original introduction in the Congress. As a consequence, there was very little time for NOAA to prepare for its new responsibilities. Soon after the act became law, NOAA assembled a small core staff in its new Office of Ocean Minerals and Energy. This core staff has managed the issuance of NOAA's OTEC licensing regulations and related tasks with full cooperation and assistance from experts located throughout NOAA.

NOAA's broad oceans expertise and experience in conducting other oceans programs made it possible for the agency to begin the efforts required by the new law quickly, and to meet the key deadlines specified in the act. In addition to using the existing resources of NOAA to the fullest extent possible, we have synthesized and built upon knowledge gained by other agencies. There are some specific information needs (such as prediction of seawater intake and discharge plumes, and analysis of potential impacts on commercial and recreational fisheries) which need to be met before licensing decisions can be made with a high degree of confidence, and NOAA has begun efforts to develop this information.

Question 19. Has NOAA received any OTEC license applications from private industry?

Answer. NOAA has not yet received any formal OTEC license applications from private industry. However, a number of corporations and groups of corporations are in various stages of planning for design and construction of OTEC plants. Many of these corporations have been in contact with NOAA about regulatory and commercial matters, and NOAA has provided the advice requested. We are fully aware of the difficulties and amount of time it takes to start up a new business using a technology which has not yet been used in a commercial venture, and our licensing regulations encourage consultations at the early planning stages of an OTEC project. Private industry is taking advantage of NOAA's offer of early consultations, and it appears that several corporations may begin serious OTEC plant design efforts soon.

Question 20. As the agency responsible for licensing OTEC ventures, NOAA would be expected to be following efforts by the DOE to support development of the OTEC industry.

(a) Please summarize the status of support for OTEC through DOE.

(b) In February of this year DOE announced that awards would be made to two applicants for contracts for Phase I work. What is the status of those awards? Are any additional Phase I awards anticipated?

(c) What is the status of OTEC research and development work funded by DOE? What part of that work is done by NOAA?

Answer. NOAA does keep informed on the efforts by the Department of Energy to support development of the OTEC industry.

(a) Congress appropriated $20.8 million for DOE's OTEC technology program for fiscal year 1982. Of that amount $4 million has been deferred (deferral D82-228) for the remainder of this fiscal year, and will be used to support preliminary design (Phase II) of an OTEC pilot plant under a contract to be awarded in fiscal year 1983. The Administration continues to believe that private industry should complete the work necessary to create a commercial OTEC industry, and no additional funding of the DOE program has been requested.

(b) In February DOE announced that Phase I (pilot plant conceptual design) awards would be made to General Electric Company and Ocean Thermal Corporation. Since that announcement, detailed contract negotiations have occured. The negotiations are nearing completion, and the DOE Office of Procurement sent final letters of contract to the two awardees on April 20, 1982. NOAA has not received any communication from DOE officials which would cause NOAA to anticipate that DOE might make more than two Phase I awards.

(c) DOE's OTEC research and development work is proceeding as required by the Congress when it appropriated funds for fiscal year 1982. In accordance with an inter-agency agreement NOAA has been providing ocean engineering and technical management assistance since late 1976 on a cost-reimbursable basis. The ocean engineering assistance has included work on ocean platforms, cold water pipes, sea water systems, anchoring, mooring, and foundations. A description of NOAA's major accomplishments in these areas during fiscal year 1981 is contained in Chapter 2 of NOAA's OTEC Annual Report submitted to the Congress on February 18, 1982. In this fiscal year NOAA is continuing to provide ocean engineering and technical management assistance, and in addition is providing advice to DOE and its contractors on licensing and permitting requirements, assistance in monitoring the progress of Phase I contractors and preparation of background material for the OTEC Technology Application and Market Development Plan which is to be submitted to the Congress in July 1983. NOAA estimates that the costs of this reimbursable work will be about one-third of the DOE OTEC research and development funds in fiscal year 1982.

[Thereupon, at 12:10 p.m. the committee adjourned, subject to the call of the Chair.]

NOAA OMNIBUS AUTHORIZATION

FRIDAY, APRIL 30, 1982

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, D.C.

The committee met, pursuant to notice, at 9:30 a.m., in room 235, Russell Senate Office Building, Hon. Bob Packwood (chairman of the committee) presiding.

OPENING STATEMENT BY THE CHAIRMAN

The CHAIRMAN. The committee will come to order.

We have a great deal of ground to cover today, so I will keep my statement brief.

We are here to receive testimony on two subjects, the 1983 budget for the National Marine Fisheries Service, and the reauthorization of the Magnuson Fishery Conservation and Management Act. Since we are well aware of the budget problems we face again this year, I will not confront this topic just yet. However, I do want to make a comment about the FCMA.

While I feel that improvements can be made in the management structure we set up in 1976, it is my opinion that the act has worked basically quite well. It is true that it has taken some getting used to, but that is not different from most Federal programs that we undertake. And it is also true that some would argue that the act has been a complete disaster. With that I would disagree strongly. But then, whoever expects complete agreement when discussing fishery issues?

The bill which Senators Stevens, Gorton, and I have introduced is a comprehensive review of the act, but I am not saying we have all the answers. We need to hear from you about any problems with the approaches that we have taken and the approaches that you think should be offered to change the existing act.

And I think I can say for all of us we are open to suggestions as to how what we have introduced can be improved. That is the purpose of these hearings.

Senator Gorton.

OPENING STATEMENT BY SENATOR GORTON

Senator GORTON. Mr. Chairman, I am delighted to participate in this hearing on the Magnuson Fishery Conservation and Management Act. That act is unquestionably the single most important piece of fisheries legislation in our Nation's history. It established a comprehensive system of American management of fisheries in an area of over 2 million nautical square miles.

The act authorized the Federal Government to conserve and manage fishery resources within the U.S. conservation zone extending from the territorial sea to 200 nautical miles from shore.

The act set up a system of regional councils to manage fisheries in recognition of the fact that fish do not respect political boundaries. Those councils have the principal responsibility for the development of fishery management plans for resources within the fishery conservation zones adjacent to the States and territories comprising the council area.

In addition, the act set rigid biological requirements, broadened management goals to include consideration of social and economic issues, set national standards against which management plans must be gauged, reserve certain resources exclusively for domestic use, and declare the right of the United States to enforce such measures.

With respect to foreign fishing, the act limited foreign catch in the zone to that portion of the optimum yield which would not be harvested by U.S. vessels in recognition of the continued strength and importance of the domestic fisheries industry.

Yet those who are intimately familiar with the day-to-day workings of the act have reported that there continue to be impediments to the smooth functioning of its procedures into the realization of its goals. These problems include the need for timely plan development, review and approval, the need for procedures for emergencies and fisheries resources, the need to make council procedures more efficient and to increase public participation, and the identification of continuing inadequacies in observer and enforcement efforts.

I am pleased to be a cosponsor of S. 2450. I believe that this bill represents a sound package of improvements to the act, but, I, too, look forward to hearing today suggestions for further improvements both to S. 2450 and to the act.

Ultimately, enactment of the legislation which emerges from this process should bring us closer to the realization of the goals of the act: To promote, protect, and develop the resources of our fisheries conservation zone.

The CHAIRMAN. Thank you, Slade.

We will adhere to our normal time limits today except for the Members of Congress and the administration, and I would urge all of you to understand that your complete statements will be put in the record, all of it, and to limit your statements so that the panel can ask questions. And I can assure you, at least speaking for myself, I do have a fair number of questions of a number of the witnesses.

Our first witness today is Hon. George Mitchell, U.S. Senator from Maine.

George.

STATEMENT OF HON. GEORGE J. MITCHELL, U.S. SENATOR FROM MAINE

Senator MITCHELL. Mr. Chairman, thank you, Senator Gorton, thank you for permitting me to share with you this morning my views on the President's recommended budget for the National Marine Fisheries Service, and on the effort to improve the Magnuson Fisheries Conservation and Management Act.

The administration wants to spend on Federal fisheries programs approximately $50 million less in fiscal year 1983 than it expects to spend this year. To achieve this reduction the President recommends the termination of the anadromous and commercial fisheries grant programs, aquaculture research and development activities, the Saltonstall-Kennedy development program, and other efforts.

I hope that many of these members of this panel share my view that most of these programs are of value.

Take, for example, the anadromous fisheries grant program, which provides States with aid to conserve, develop, and enhance anadromous fisheries. This effort is slated to receive $3 million nationally during the current fiscal year. Without this program the State of Maine will be extremely hard pressed to rejuvenate the American shad population in the Kennebec and Androscoggin Rivers, and the alewife stocks in the Damariscotta River.

Similarly, without the Federal assistance which the commercial fisheries research and development grant program and the fisheries development grant program provide, the State of Maine may not be able to adequately survey its clam flats for the dangerous red tide, will be hard pressed to adequately gage the harvesting pressure on its lobster stocks, and it will have to substantially reduce its ongoing fisheries research and development projects.

I have introduced legislation which would, beginning in fiscal year 1984, establish a block grant program for States, some of the resources from which could be used to manage, develop, and responsibly exploit living marine resources.

This block grant program would be funded with a portion of the revenues resulting from new OCS leases. I mention this measure here this morning because it is one of several serious proposals which seek to provide a secure, dependable source for many fishing related activities. These are activities which to this point have relied on Federal funds channeled through the Federal Fisheries Service budget.

I take this opportunity to urge the committee to consider in the course of its deliberations on the fiscal year 1983 budget at least the possibility that Congress may be receptive to a wholly new funding mechanism for coastal programs beginning in fiscal year 1984. It would, in my judgment, be unwise and counterproductive to terminate some of our best fisheries programs in fiscal year 1983 only then to have the States restart them using block grant funds in fiscal year 1984.

Mr. Chairman, you and other members of this committee have demonstrated your strong interest in the fishing industry and your desire to foster an environment in which this important industry can prosper. I am confident that with your leadership and that of other committee members you will formulate a budget which preserves these programs which State and industry representatives deem as vital.

The second subject on which I will comment briefly this morning concerns the Magnuson Fisheries Conservation and Management Act and the various proposals to improve it. The first of these was introduced by me and Senator Cohen last September.

Our measure included recommendations made by the eight regional fishery management councils which were established under the Magnuson Act. Our bill was intended to achieve three objectives: To make the councils more effective; to rectify various misinterpretations of the intent of Congress in creating the council system; and to streamline the council management process.

The package of amendments which our bill represented was the result of considerable study and discussion by representatives of the eight councils at a series of meetings. A final meeting involving the chairmen and executive directors of the councils was held last June in Homer, Alaska. Since the Homer meetings and the introduction of S. 1668—that is the bill to which I referred—the subject of the Magnuson Act reform has received considerable attention.

The House is well along in the process of developing its own bill, and your staff has formulated yet a third package of provisions now referred to as the Senate working draft.

It is my hope and expectation that those who will testify here today will tell this committee which provisions in these measures will best improve our fisheries management and conservation procedures and policies.

Clearly, the Magnuson Act has deficiencies. We all know that. Nevertheless, the act remains one of the most innovative and important legislative accomplishments of recent years. Not only did it extend the resource jurisdiction of the United States to 200 miles, but it provided a means by which industry representatives can actively involve themselves in policymaking. Moreover, it provides a useful institutional framework in which fisheries disagreements can be resolved.

It is my hope that Congress, working with council members and their staff as well as with industry spokesmen, can improve the act, remove the obstacles which lead to the continuing frustration of council members, and generally improve the framework in which important fisheries-related decisions are made.

Thank you, Mr. Chairman, for your courtesy in permitting me to testify here today.

The **Chairman**. Thank you, George. I have no questions.

Slade.

Senator **Gorton**. No questions.

The **Chairman**. Very good statement. I agree with most of it.

Senator **Mitchell**. Thank you.

The **Chairman**. Our next witness will be Hon. Baltasar Corrada, the Resident Commissioner of the Commonwealth of Puerto Rico.

STATEMENT OF HON. BALTASAR CORRADA, RESIDENT COMMISSIONER, COMMONWEALTH OF PUERTO RICO

Mr. **Corrada**. Thank you very much, Mr. Chairman.

I would ask that my full testimony be made part of the record. It consists of four pages and attached to it a legal opinion issued by the National Oceanic and Atmospheric Administration, dated July 31, 1981, which I would like to also be made part of the record.

The CHAIRMAN. Your entire statement and the accompanying opinion will be in the record. And again I will say to all of the witnesses all of your statements in their entirety will be in the record.

Mr. CORRADA. Mr. Chairman, I appear before you today as the elected representative to the U.S. Congress of the 3.2 million U.S. citizens living in Puerto Rico.

Our Government is very concerned about an amendment to the authorization of the Fisheries Conservation and Management Act that have been proposed by the Caribbean Fisheries Management Council without prior consultation with the government of Puerto Rico.

The amendment would limit for the purposes of this act Puerto Rico's jurisdiction over its navigable waters to 3 nautical miles. I am troubled by the inclusion, any possible inclusion of such limitation for Puerto Rico. It is not included in the bill that has been introduced in the Senate.

As proposed, the amendment would amount to curtailment of previously recognized authority over fisheries resources, proprietary rights and management as clarified by Public Law 96-205 passed by Congress and signed by the President on March 12, 1980. That law specifically recognized Puerto Rico's control over its submerged lands out to a distance of 3 marine leagues, consistent, of course, with Spanish tradition at the time of the transfer of Puerto Rico from the crown of Spain to the Government of the United States.

In my testimony I cite precisely the provision in the law to which I refer. The enactment of this law clarified once and for all the extent of Puerto Rico's ownership of its submerged lands and navigable waters.

In a letter to the Caribbean Fisheries Management Council dated August 3, 1981, the Acting General Counsel of the National Oceanic and Atmospheric Administration stated—that letter, by the way, is dated July 31, 1981—"We have concluded that Public Law 96-205 by amendment to the Jones Act did change the geographic coverage of our council and the management authority of the Secretary of Commerce." A legal opinion prepared by the Office of the Assistant General Counsel for Fisheries concludes that Congress intended that management jurisdiction over fishery resources within 3 marine leagues would be vested in the Commonwealth of Puerto Rico; hence, the inner boundary of the fishery conservation zone adjacent to Puerto Rico lies 3 marine leagues from the Puerto Rican coastline. The Department of Justice has reviewed the GCF legal opinion and supports that conclusion.

In the markup of this bill before the House Merchant Marine and Fisheries Committee, an amendment was proposed to limit Puerto Rico's jurisdiction to 3 nautical leagues after a conversation that I had on the subject matter with my dear friend, John Breaux. He asked for unanimous consent, and that was granted by the full Merchant Marine and Fisheries Committee, to delete such an amendment from the bill.

And, Mr. Chairman, I urge this subcommittee not to accept any proposal which would intend to restrict in the case of Puerto Rico jurisdiction to 3 nautical miles which would be inconsistent with an act of Congress passed in 1980.

However, let me point out it is the position of the Government of Puerto Rico to continue working with the council on matters of mutual interest. We support the implementation of the concept of shared fisheries with the Caribbean Fishery Management Council, and Puerto Rico looks forward to developing this idea.

The **CHAIRMAN**. I might say, to the best of my knowledge no one on this committee has suggested going to the 3-mile limit, and I do not think we have any intention of putting it in the bill, and my hope would be that the House would defer and withdraw from their position when we go to conference on it.

Mr. **CORRADA**. They have already withdrawn because the amendment, which had already been accepted by the full Merchant Marine and Fisheries Committee, was deleted at my request by a request made by Congressman John Breaux. So I just wanted to protect myself, a little act of prevention before your subcommittee. And I am very pleased by your remarks, Senator Packwood.

The **CHAIRMAN**. That is a very smart way to look at things in this Congress, but I can assure you that we will not put it in on this side.

Mr. **CORRADA**. Thank you very much. Thank you, Senator Gorton.

Senator **GORTON**. I agree.

The **CHAIRMAN**. Senator Stevens.

Senator **STEVENS**. I agree, too.

The **CHAIRMAN**. Thank you very much for taking the time to come over.

Mr. **CORRADA**. Thank you very much to all of you.

[The statement follows:]

STATEMENT OF HON. BALTASAR CORRADA, RESIDENT COMMISSIONER, COMMONWEALTH OF PUERTO RICO

Mr. Chairman, I appear before you today as the elected representative to the United States Congress of the 3.2 million U.S. citizens living in Puerto Rico.

The government of Puerto Rico is very concerned about an amendment to the reauthorization of the Fisheries Conservation and Management Act that has been proposed by the Caribbean Fishery Management Council without prior consultation with the government of Puerto Rico. The amendment would limit, for the purposes of this Act, Puerto Rico's jurisdiction over its navigable waters to three nautical miles. I am troubled by the inclusion of such a limitation for Puerto Rico.

As proposed, the amendment would amount to a curtailment of a previously recognized authority over fisheries resources, proprietary rights and management as clarified by PL 96-205 passed by Congress and signed by the President on March 12, 1980 (48 USC 749). That law specifically recognized Puerto Rico's control over its submerged lands out to a distance of three marine leagues. The law states that: ". . . 'control' includes all right, title, and interest in and to and jurisdiction and authority over the submerged lands underlying the harbor areas and navigable streams and bodies of water in and around the island of Puerto Rico and the adjacent islands and waters, and the natural resources underlying such submerged lands and waters, and includes proprietary rights of ownership, and the rights of management, administration, leasing, use and development of such natural resources and submerged lands beneath such water."

The enactment of this law clarified once and for all the extent of Puerto Rico's ownership of its submerged lands and navigable waters. In a letter to the Caribbean

Fisheries Management Council dated August 3, 1981, the Acting General Counsel of the National Oceanic and Atmosphere Administration (NOAA) stated that:

"We have concluded that PL 96-205, by amendment to the Jones Act, 48 USC Sec. 749, did change the geographic coverage of your Council and the management authority of the Secretary of Commerce. A legal opinion prepared by the Office of the Assistant General Counsel for Fisheries (GCF) concludes that Congress intended that management jurisdiction over fishery resources within three marine leagues would be vested in the Commonwealth of Puerto Rico: hence, the inner boundary of the fishery conservation zone adjacent to Puerto Rico lies three marine leagues from the Puerto Rican coastline. The Department of Justice has reviewed the GCF legal opinion and supports that conclusion. The fact that Puerto Rico has general marine fishery jurisdiction out to three marine leagues does not affect the Council's authority under the Magnuson Act to prepare FMPs for fisheries occurring beyond three leagues."

The July 31, 1981 legal opinion drafted by counsel at NOAA goes into the legislative history of PL 96-205 as well as into the impact of that law in defining the fishery conservation zone for Puerto Rico. Mr. Chairman, I ask that this opinion be included at part of my testimony to the record of this hearing.

The government of Puerto Rico is very interested in and has a responsibility to properly manage its fishery resources. To that end, Puerto Rico has worked closely with the Caribbean Fishery Management Council in the past on a great number of issues. One of the few areas of disagreement between us is on the issue of jurisdiction over its territorial waters. It is the position of the government of Puerto Rico that there be no change in Puerto Rico's jurisdiction over its territorial sea for purposes of this Act.

Mr. Chairman, on Wednesday the House Merchant Marine and Fisheries Committee held a markup on H.R. 5002 to reauthorize the Fisheries Management Conservation Act. As reported by the Fisheries, Wildlife Conservation Act. As reported by the Fisheries, Wildlife Conservation and the Environment Subcommittee, the bill included an amendment to 16 USC 1811 limiting the territorial sea of Puerto Rico to three nautical miles for purposes of this law. My good friend and Chairman of the Subcommittee John Breaux agreed to withdraw the amendment when I informed him of both mine and the government of Puerto Rico's strong opposition to the placing of this restriction on Puerto Rico. As you know, Mr. Chairman, two other states—Texas and Florida—exercise jurisdiction over its territorial sea out to a distance of three marine leagues and yet only Puerto Rico is included in this restriction. I urge the Committee to refrain from making any changes in Puerto Rico's current jurisdiction over its territorial sea.

It is the position of the government of Puerto Rico to continue working with the Council on matters of mutual interest. We support the implementation of the concept of shared fisheries with the Caribbean Fishery Management Council and Puerto Rico looks forward to developing this idea. It is important that communication between council officials and representatives of the state agencies involved be maintained and strengthened to ensure that the necessary cooperation and coordination is achieved.

I will be happy to answer any questions you may have.

The **Chairman**. Senator Stevens, do you have an opening statement? Slade and I had a short statement.

Senator **Stevens**. After fighting the battle of the Falklands yesterday, I did not get a chance to prepare a statement, so I have none.

The **Chairman**. Did you win or lose?

Senator **Stevens**. I am not sure.

The **Chairman**. You are not sure.

Our next witness will be Mr. William Gordon, Assistant Administrator for Fisheries for NOAA.

Mr. Gordon.

STATEMENT OF WILLIAM GORDON, ASSISTANT ADMINISTRATOR FOR FISHERIES, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE

Mr. **Gordon**. Thank you, Mr. Chairman.

I have a fairly lengthy testimony. I will submit it for the record and synthesize it into a few comments.

The **Chairman**. Thank you.

Mr. **Gordon**. First of all, I would like to talk a little bit about the accomplishments under the Magnuson act. I think we have come a long way in a very short period of time. Twenty-three fisheries that are in need of management have been brought under management by the councils. I congratulate the councils in being fairly selective in picking only those that were clearly in need of management and have proceeded along that track.

The management process has been greatly streamlined in the period of time that the Magnuson act has been in place. We have moved a long ways in terms of assisting the industry in making substantial improvements. The value of the domestic landings, the commercial landings from the fisheries conservation zone, are up by $400 million since pre-act. Total domestic landings are up 250 percent. I think that speaks very well for the performance of the industry when an institutional arrangement provided an opportunity for them to do so.

Exports from the United States are up 300 percent. They were $385 million in 1976. They were $1.2 billion in 1981.

So I think that the act has been very successful in assisting the industry to begin to develop an export market and to offset the rising imports.

I would like to also congratulate your staff. I think they have put together a very good package of amendments, a number of which we think we can generally support.

We support the amendments dealing with reducing future allocations for foreign nations not complying with commitments. Providing access to the fisheries conservation zone and State waters for not-for-profit recreational vessels from foreign nations likewise we can support. Strengthening the compliance role of the observers we fully support, and we would support removing the observer fund from the congressional appropriation process so that we can bring that fully into compliance with the act.

The adding of the Northern Marianas representation on the Western Pacific Council is a well-needed improvement.

Improving the council appointment and removal process likewise is a worthwhile improvement.

The submission of proposed regulations with council plans; we have long advocated that and think that is a worthwhile improvement.

Broadening the emergency provisions to include resource needs and reasons is likewise a well-needed improvement.

Clarifying fisheries management authority in enclaves is a good move, and it will relieve some of the points of contention that have existed.

Altering the criminal penalties provisions of the act is likewise an improvement.

Permitting seizure of fair market value of fish is long overdue, and it will improve the enforcement of the act.

Deleting certain report requirements is likewise appropriate.

We generally oppose those amendments dealing with the elaborate systems for councils justifying decisions on whether a fishery needs to be managed. We think it is unnecessary in that we have a workable system in place.

The council comments on activities affecting fishery resources is unnecessary because the act already allows them to do so.

Substitution of procedures for the Advisory Committee Act requirements is unnecessary.

The acceleration of the plan process, exemptions of certain requirements of the Regulatory Flexibility Act and so on, we generally oppose because it would have an adverse impact on an adequate public input into requirements of the plan.

Because of the needs of achieving a balanced budget, we would oppose the proposed authorization levels.

In general, we think certain proposed amendments to speed up the plan process are unnecessary at this time because we have worked very hard to streamline that process, to suggest multiyear plans, to have multispecies fisheries encompassed in the one plan. The councils have moved in this area, and we think this is a very good first step on the part of the councils in streamlining that process. We think that they will continue to operate in that direction.

Let me shift briefly to comments on the 1983 budget. We have proposed a base level of $106.7 million. This is consistent with the desire to reduce Federal spending, eliminate some of the lower priority programs, and transfer certain programs to the States, local governments, and the private sector.

We would continue our essential stock assessment activities in gathering fishery information important to the management of certain fisheries. We intend to streamline the management process further. We will continue to seek economic and statistical information necessary for management of fisheries.

We will also continue to emphasize joint ventures and the voluntary seafood inspection program in cooperation with other elements of the Department of Commerce and other departments in moving our "fish and chips" program and the fisheries development program ahead.

We will continue our basic research and management programs for marine mammals and endangered species. And we will better integrate our habitat conservation activities with fisheries management and development.

In short, we believe the budget that is proposed for 1983 will provide ample resources, given the austere budget situation, to continue to move ahead in carrying out the requirements not only of the Magnuson Act but the other acts that are assigned to the National Marine Fisheries Service.

Thank you, Mr. Chairman. I would be more than happy to respond to questions.

The CHAIRMAN. Thank you, Mr. Gordon.

I ask the clerk to hold us to our 5-minute time limits on questions. I know we have quite a few.

Over the years we have given the Fisheries Service additional duties—the 200-mile limit, the endangered species, the marine mammals, fisheries development—yet you have fewer employees than you had 10 years ago, and the budget that you are asking for 1983 is about a one-third reduction.

How are you going to carry out these additional duties with what is, if approved, a significant cut in your budget?

Mr. GORDON. Well, the budget, as you correctly point out, is reduced by approximately one-third. This would reduce personnel by only about 15 percent.

The CHAIRMAN. But that is a reduction from even where you were before. I realize that is a reduction next year, but you are down to fewer employees than you had 10 years ago, aren't you?

Mr. GORDON. Approximately the same as 10 years ago, sir.

The CHAIRMAN. But with significantly enhanced duties.

Mr. GORDON. That is correct. Some of the duties that were done 10 years ago were gradually phased out as the usefulness to the private sector or others was no longer so much of a priority. We would accommodate some of the activities by transferring certain Federal programs to the States and to the private sector where appropriate. Other savings would be accommodated by increased attention to the potential areas of cooperation with the States.

The CHAIRMAN. I did not hear. Other duties would be what? What was the statement?

Mr. GORDON. Other savings would be accomplished by increased attention to potential areas of cooperation with the States in a partnership role. We just finished 2½ days of talking with our partners in the States about areas where we could achieve potential savings by pooling our resources. We would also eliminate other low-priority activities, achieve additional increased efficiencies internally, particularly in the area of management, and minimize the budget and personnel required to carry out these programs within the agency.

All in all, we think we can survive the austerity period by these efficiencies and sharing with our partners more activities.

The CHAIRMAN. By sharing with your partners you do mean shifting to the States increased acceptance of costs.

Mr. GORDON. Yes, sir.

The CHAIRMAN. And you have been meeting with the States this week.

Mr. GORDON. Yes, sir.

The CHAIRMAN. Have they accepted or indicated a willingness to accept this increased financial responsibility?

Mr. GORDON. Not in total.

The CHAIRMAN. Have they at all?

Mr. GORDON. Well, I think we all agree there are some efficiencies that we can carry out—collection of data maybe in enforcement—by planning more rationally for the application of our joint resources.

The CHAIRMAN. Let me ask again, have the States indicated that they would be willing to pick up an increased portion of the costs?

Mr. GORDON. Not the majority, no.

The CHAIRMAN. Has any State?

Mr. GORDON. Yes.

The CHAIRMAN. Which one or ones?

Mr. GORDON. Some States, particularly in some areas, would agree to share some of the costs such as in data collection. This is a program that we have put into place over several years. We are funding computers for the States to utilize, and the entire west coast is picking up some of this activity. Some of the east coast States are picking up some of this activity.

The CHAIRMAN. Can you tell me by name which States have said they would pick up this increased cost?

Mr. GORDON. Well, I have to qualify that by saying they would not assume 100 percent of these costs. We look upon them as shared, and the entire west coast is now sharing with us the data collection system. It is not adequate to totally meet our needs, but it moves ahead. Some of the Gulf States likewise have accepted a responsibility to increasingly collect these statistics. Again, not 100 percent, but they will be sharing with us their data, and that brings about some efficiencies we think will save money, which we can then in our ongoing program contract with the State to carry out those.

The CHAIRMAN. Let me ask once more—I realize you are saying not 100 percent—but I want to know which States have said they would be willing to pick up part of the increased costs, because I then want to go to those States and make sure they have agreed to this, because I have not heard any States say they could or would pick up any increased proportion of these costs.

Mr. GORDON. Perhaps I should rephrase it so that there is no misunderstanding here. By sharing with them some of our continuing program, we will have available some of those dollars. They will then shoulder some of the burden of collecting some of the data. We anticipate this will be done with States like North Carolina and South Carolina, with some States in the Northeast who had ongoing programs, like Massachusetts and others. Washington, Oregon, and California already are sharing with us some of their data. We anticipate this program will continue. We anticipate that we will be able to share some of our dollar resources with them in the collection of this data.

The CHAIRMAN. How does that happen?

Mr. GORDON. By creating some efficiencies within the National Marine Fisheries Service, we anticipate freeing up some dollars that we can pass on to them.

The CHAIRMAN. But you will pass on to the States to help them with the collection of data which they will share with you.

Mr. GORDON. Yes, sir.

The CHAIRMAN. But there will be no increased burdens on the States from any of the programs under your jurisdiction? Any increased burden will be matched by moneys that you will shift over to them?

Mr. GORDON. That is the way we see it, sir.

The CHAIRMAN. On every program.

Mr. GORDON. Not on every program. Principally on data collection and some on enforcement.

The CHAIRMAN. So there will be some cases where the States will have to pick up some additional costs themselves.

Mr. GORDON. If we fully meet our data informational needs, that is correct.

The CHAIRMAN. And lastly, because I am over my time, on those programs, have any of the States indicated their willingness to pick up that additional cost?

Mr. GORDON. No, sir.

The **Chairman**. Thank you.

Senator Gorton.

Senator **Gorton**. What percent of the total value of the Columbia River salmon catch is attributable to the present hatcheries program?

Mr. **Gordon**. I am not entirely certain on that. I would have to look it up to be positive. I would not want to confuse you.

Senator **Gorton**. Will you submit that answer for the record? But at this point, they state that it is substantial.

Mr. **Gordon**. Yes, sir, it is.

The **Chairman**. My understanding is, it is about 75 to 80 percent.

[The following information was subsequently received for the record:]

A total of 70 percent of the coho salmon and 42 percent of the fall Chinook Salmon caught in the Columbia River are produced at Columbia River Fishery Development Program facilities. These facilities contribute a total of 14.8 percent of all fall Chinook and 15.6 percent of all coho catches from Alaska to California.

Senator **Gorton**. I agree with you, Mr. Chairman. Has the State of Washington or for that matter the State of Oregon indicated that either of them will be capable of funding the Columbia River hatcheries program and maintaining it at its present level of production with this reduction of Federal spending and phaseout?

Mr. **Gordon**. No, sir.

Senator **Gorton**. To what extent will the Columbia River hatcheries program have to be scaled down if this funding is cut out?

Mr. **Gordon**. I think it will be proportional to the funding in the short term. There are potentials that we are evaluating to find alternative sources of funding, to try and continue the program. That study is ongoing now. I will have a recommendation from the regional people. We will pursue that aggressively, with the hopes of continuing to phase down the program from a Federal budget standpoint. We can find alternative sources of funding in 1983.

Senator **Gorton**. But it is safe to say, in answer to, if we make specific the answer to the general question from the chairman, that neither of the States feels that it can substitute its own funding for your program or has accepted this program.

Mr. **Gordon**. That is correct, Senator.

The **Chairman**. Could I interrupt and ask a specific question on this?

Senator **Gorton**. Sure.

The **Chairman**. Is it not true that the Northwest Office of the National Marine Fisheries Service has told the States of Oregon and Washington that six hatcheries and two rearing stations will be closed, which constitute about 71 percent of the hatchery escapement of the total run?

Mr. **Gordon**. In our preliminary planning for the 1983 reductions, we identified certain hatcheries to match up with the total amount of money that would be phased out in 1983, and your estimates are essentially correct.

The **Chairman**. And not only are they correct, that is only for Oregon. Could you name those hatcheries that you will close?

Mr. **Gordon**. We had suggested in the proposed 1983 reduction that the Bonneville, Spring Creek, Oxbow, Cascade, Gat Creek, Skamiania, Beaver Creek, Ringold, Elokomin, and Klickitat hatcheries would all be involved. If the budget is made available, we would presume the States might suggest other hatcheries that would be involved, some that might be less efficient if this budget were to be finalized.

The **Chairman**. Go ahead.

Senator **Gorton**. Would you read the Washington ones, too, while you are at it?

Mr. **Gordon**. The Ringold is the Washington Department of Game hatchery that would be involved in our suggested ones.

Senator **Gorton**. Aren't there five or six to be closed?

Mr. **Gordon**. Mr. Chairman, the reduced Federal funding for the Columbia River hatchery program will terminate NMFS financial support for four hatcheries in Oregon and six in the State of Washington. The specific hatcheries involve: Oxbow, Gnat Creek, Bonneville, and Cascade hatcheries in Oregon and the Elokomin, Skamania, Beaver Creek, Spring Creek, Klickitat, and Ringold Trout in the State of Washington.

Senator **Gorton**. What impact are these cuts likely to have on the United States-Canadian salmon interception negotiations?

Mr. **Gordon**. Certainly the hatchery production is a part of the considerations in the negotiations with Canada and could have some impact on the success of those negotiations.

Senator **Gorton**. Was the chief negotiator for the United States consulted to determine this possible impact?

Mr. **Gordon**. He is aware of the proposed cuts. To my knowledge, he was not advised of this prior to the proposed cuts going forward.

Senator **Gorton**. On another subject, I understand that Japan's allowable catch was recently reduced by 10 percent. In light of some of the testimony we have from other witnesses here, can you explain the reasons, the rationale for this?

Mr. **Gordon**. Starting in 1982, after consultations with our partners in the State Department, we advocated a staged allocation of surplus fish to the foreign governments, starting in January, and a review on their performance in terms of removing tariff barriers, both tariff and nontariff barriers. Their compliance with "fish and chips", their enforcement record, and all other allocation criteria would be reviewed prior to an April allocation of additional amounts of fish.

On very close scrutiny of the performance of the various governments toward achieving the intent of Congress and the American Fisheries Promotion Act, and the Magnuson Act, we have made a determination that some have not been doing as well as in our view they could have, particularly in removing trade barriers, and so we have limited their allocations this past month.

Senator **Gorton**. That is the rationale for the cut?

Mr. **Gordon**. Yes, sir.

The **Chairman**. Senator Stevens.

Senator **Stevens**. Mr. Gordon, my colleague asked a question about the 10 percent. I want you to know that that reduction, as far as the Japanese effort, the 10 percent was primarily in the Alaska North Pacific Regional Council zone, is it not?

Mr. **Gordon**. That is correct, sir.

Senator **Stevens**. We want to make certain the record shows we welcome that reduction, having half of the area that is under the

Magnuson Act, and only about a 10 percent U.S. effort in the area of the Aleutians where the Japanese are so active. We believe that it is impossible to have the development of a domestic fishery if the allocation goes to the foreign fishermen every year, and it does seem to me that the impact that the new policy is having is to see a growth in domestic capability, which I think is going to be a good thing in the long run.

Can you tell me, do you have the records now, in terms of the foreign fish catch in dollars and the U.S. catch in dollars? What is roughly the balance as far as the whole 200-mile zone now in the United States?

Mr. GORDON. The catch of the foreign governments has been reduced about 33 percent in total. I think I could provide this for the record on a geographic basis so you could really see the impact around the United States. The biggest impact, I think, has been on the east coast, and off Washington and Oregon.

Senator STEVENS. There has been a significant reduction in foreign effort, not only just in Alaska, but in the balance of the FCMA.

Mr. GORDON. Very, very significant change, sir, and its impact on fishing has been most striking on the east coast.

Senator STEVENS. Yet I am told that we still have some $3 billion deficit in our balance of trade in fisheries products.

Mr. GORDON. That is correct.

Senator STEVENS. Is that because of increased exports from the foreign fishing fleets to this country from our own water?

Mr. GORDON. Well, in part, it is a continued very high demand for products that never have been and never will be available from the waters of the United States. I think that the challenge for the American fishing industry is to encourage U.S. consumers to eat some of the products that heretofore have been sold in some foreign lands.

The principal one where the big potential is is the Alaskan pollock, where we are still allocating over a million tons of the product to foreign countries, some of which does come back to the United States in block form, where it is remanufactured to individual portions. We have a very significant challenge, yet at the present growth of the seafood market in the United States, the American industry will have to catch 2.5 million tons more product within the next decade to meet that demand in 1992.

And so, that potential is here, the challenge is here, and I think it is something that the American industry will respond to if we can create the appropriate climate for them to move aggressively into.

Senator STEVENS. That is the climate I want to talk to you about. We see increasing costs for the distant water fleets of the foreign governments, and we see that the problems of food scarcity throughout the world, that we could help meet as we have met in the early agriculture area with increased production of our commerce. We feel we could increase the production and efficiency of our fishing fleet if we had the full cooperation and really direct all of the powers of the Federal Government toward assisting in the development of the domestic fishing effort.

Do you agree with that?

Mr. GORDON. Yes, sir, I do.

Senator STEVENS. How are we going to bring it about? That is really my question. Do you know the impediments that stand in the way now of developing a domestic fishing fleet as far as the areas of great potential. I think the Aleutians, for instance, as I have said, only 10 percent of the great potential of the Aleutian Islands area is harvested by domestic fishing fleets, 90 percent by foreign fishing fleets. Now, what can we do through the use of Federal efforts to move those foreign fishermen out and to move in capable, highly efficient domestic capability?

Mr. GORDON. In the short term, I think we can assist our fishermen in the best way by achieving more direct sales, that is, from the fishermen to the foreign processing vessel. That is possible. I think it is possible right now and in the near term, and I expect this year we will have achieved in the Gulf of Alaska and the Bering Sea and off Washington and Oregon at least 300,000 tons of joint venture sales of products that are sold to foreign processing vessels.

In the longer term, we have to create a climate for risk capital to flow into those areas to develop the processing capability in the United States to process that product that is now finding a ready market abroad into a product form that is acceptable in the U.S. marketplace. Also, the industry, in whatever way we can assist, has to aggressively market that product as substitutes for what we now are buying as imports, transformation into forms or products that the American consumer will eat. I think it is possible, but it is going to take a real joint undertaking on the part of the Government and the industry.

Senator STEVENS. Thank you very much, Mr. Chairman. I think we sometimes hear about joint ventures here and really do not understand the necessity for this phase of development of the 200-mile limit concept, as far as the North Pacific Fisheries Management Council is concerned. We might go into it in more depth some other time, but I appreciate the time.

Mr. GORDON. I would just like to add one comment to that. At some point we are going to have to say no to the joint ventures in order to help our processing industry make that move, and it is going to vary geographically. On the east coast it is going to come sooner. Perhaps Washington, Oregon, California will come next, and Alaska last, because it is certainly helping the American fisherman to move into areas and catch fish he never caught before, learn new technology that is being transferred, and to me it is a good interim policy to move in that direction.

Senator STEVENS. This is not the time to discuss it. I have discussed it with other Members of the Congress, the possibility of bringing ashore some of the funds that are set-aside for vessel replacement under the existing tax incentive that we are all familiar with, so that the fishermen could participate in the development of some of those on-shore processing facilities, and the next generation of fishermen on the domestic scene, they are going to have a substantial reserve, and I think that—in other words, taking the cooperative concept from the agricultural section of the country and apply it to the development of processing on shore is going to be a logical development in my opinion downstream, maybe 10 or 15 years away, but it is going to come.

Mr. GORDON. I do not think it will take that long.

Senator STEVENS. Thank you.

The CHAIRMAN. I should warn you, Mr. Gordon, Senator Stevens is tired today, but you should never in his presence say "Alaska last."

I expected a much greater reaction. I want to go through that list of hatcheries in Oregon and Washington again that would be involved, was your word. Involved, translated, means closed, doesn't it?

Mr. GORDON. Not necessarily. I think the program managers on the Columbia, which is again a partnership between the Federal Government and the States, eventually will make those decisions. Some of those hatcheries are very efficient and some are less efficient by and large because of their age and perhaps their water supply and other things. I think that choice should be made within the program area rather than by a Federal mandate.

The CHAIRMAN. You understand that the Northwest Office of the Fisheries Service has told the States of Oregon and Washington which hatcheries they will withdraw from if the cuts total what you are suggesting.

Mr. GORDON. This document which was distributed by the program office; I view it as a general guidance document. It did not have my blessings. It was an attempt to inform program managers in the affected States of potential 1983 budget impact. The actual decision of which hatcheries would be closed will be negotiated with the States.

The CHAIRMAN. You have used this word, "partnership," and that means that some of those hatcheries might be kept open if the States want to fund them.

Mr. GORDON. Yes, sir.

The CHAIRMAN. I will ask the same question Senator Gorton asked. Has either the State of Oregon or the State of Washington indicated that they could or would fund any of those partnership hatcheries if the Federal Government withdraws from their part of the partnership?

Mr. GORDON. No, sir, they have not.

The CHAIRMAN. I would go further and say the information I have at least from Oregon, is not only have they not said it, they have said to me they will not, they cannot, and they will simply be closed, period. Now, let's move on to the Saltonstall-Kennedy funds. Congress has repeatedly directed that all of the funds in the S-K account are to be used to develop the fishing industry, and yet the administration wants to divert all of these funds to other programs. Why is the administration ignoring the clear instruction of Congress in this area of fisheries development for these funds?

Mr. GORDON. Under the President's economic recovery program, the incentive for development is provided in the marketplace. The fishing industry will likely develop where adequate incentives exist. In an attempt to achieve a balanced budget, the Government has suggested that we phase out of the industry grant program and allow the private sector to pick up on it. We think that we can continue to assist the industry by working within the administration to reduce inflation, bring the interest rates down, work in the areas of international trade negotiation, export market development, and product quality and safety, which are areas that the Federal Government perhaps can do where no single segment of industry can achieve any substantive change, and allow the private sector then to concentrate on those things that they can best do for themselves and achieve success. It is with that philosophy in mind that the administration is proposing a phase-out of the S–K industry grant program.

The CHAIRMAN. By the way, I see Secretary Adams in the audience. Brock, I will put you on as the next witness when we are done here.

Are we agreed, Mr. Gordon, that the present law says that the S–K funds will be used for the fisheries development?

Mr. GORDON. That is correct, sir.

The CHAIRMAN. Now, can I have at least your word that if the law is not changed, that you will use those funds for that purpose?

Mr. GORDON. If the law is not changed?

The CHAIRMAN. If the law is not changed.

Mr. GORDON. I would be guided by that law and carry out the mandate.

The CHAIRMAN. Thank you. Now, let's go to the wild stocks of the salmon in the Northwest. As you are aware, there is a significant concern among many groups that the wild stocks are being depleted or at least not adequately protected. Do you want to address yourself to that question and those concerns?

Mr. GORDON. That is a very complex one, sir. Some runs clearly have been seriously jeopardized by environmental degradation, perhaps some by overexploitation. These are generally the up-river strains of salmon or some other smaller coastal streams where escapement for sporting purposes has severely declined. To manage that very complex ocean fishery to achieve restoration of some of these wild stocks by natural spawning is an exceedingly complex task. I think the council has tried very hard, and the States have tried very hard to provide for escapement back to these parent streams. In the case of the Columbia, the headwaters of the Columbia are in Canada, and some of those strains may be seriously jeopardized by running the gauntlet of all the dams and the fisheries both in the main stem streams as well as in the ocean.

Given those circumstances, I think that we are doing about as good as we can, and as our knowledge base improves, so will those wild stocks.

The CHAIRMAN. I hear your answer, but I am not sure I understand it. Can I paraphrase it? You are concerned, but you are not quite sure what the answer is, and hopefully as knowledge increases the stocks will increase.

Mr. GORDON. Well, I think the answer lies in an appropriate mix of a conservation program that guides the fishery in the ocean and in the main stem streams, so that adequate spawning escapement can take place. Because there is such a mix of these strains in the ocean, the managers do not yet know how to regulate the ocean fishery so as to achieve this escapement. The only positive way to do so now would be to severely curtail the ocean fisheries, and allow a tremendous waste potentially to occur of salmon that are not destined for those more remote areas or for those coastal streams. So the managers try to balance a maintenance of an ocean fishery for a high value, high quality product, and at the same time try to achieve escapement goals into these streams. I think they are changing. They have made significant improvements in 5 years. They are continuing to work hard at this, and I think given a better knowledge of how those fish intermingle in the ocean they can achieve it. It is going to take time to achieve that level of understanding.

The CHAIRMAN. Senator Gorton.

Senator GORTON. I will yield to you. It is an interesting series of questions.

The CHAIRMAN. I think there is no point in pursuing that question any further. We have reached a dead end on it. I want to come back to some of these partnership programs. Let's take the Commercial Fisheries Research and Development Act. These are grants to the States on a cost sharing basis, and many of the programs and species that are involved move across State boundaries. You cannot say, this is a North Carolina fish and a North Carolina program any more than you can say that half the salmon that come out of the Columbia River go to Oregon and half go to Washington and none go any place else. You are targeting this program, I would say for termination; you are saying for further partnership shifting to the States, as I understand the term. I just want to make sure. Has any State indicated to you that they are prepared to operate these programs at the present level using State funds?

Mr. GORDON. No, sir.

The CHAIRMAN. Not a one. That is my sense, too. Originally, the National Marine Fisheries Service maintained that all fisheries required management plans. That was at least the initial concept. You now say that the council and your agency can work together to determine if a plan is needed, and that a clarifying amendment to the act is unnecessary. Yet, the councils tell us that a change is needed. Why do you think there is no problem?

Mr. GORDON. Well, my understanding of it is that there are several factors involved. One is a belief that we are keeping score on the councils.

The CHAIRMAN. Keeping score on the councils?

Mr. GORDON. Keeping score on the councils, and if there is not a management plan, that they are not doing their job. There is also a feeling that all fisheries should be brought under management so as to preclude potential of overfishing occurring. That seems contrary to the administration's wishes to deregulate. With appropriate monitoring of those fish stocks, it takes only a low level of Federal investment or State investment for that matter, for one to ascertain the general health both of the stock and of the fishery.

Under those circumstances, I think the councils by and large have achieved recognition of what fisheries need to be managed and they doing so either with a plan in place or actively pursuing the development of one. In addition, they are combining many of the single species plans that they initially thought were necessary into multispecies plans, because the fishery was capturing a mix of species, and it was the fishery that we should have focused on, the people side of it. We do not need to move aggressively to manage every fishery. We should not unnecessarily burden American fishermen if the fishery does not need a set of regulations on it. Management is a different term, and can mean simply monitoring, and understanding a fishery. We do not need a fisheries management plan to monitor.

So, there are some different philosophies that are coming from the councils that perhaps is a matter of semantics. Regulation is one thing. Some fisheries are clearly overfished and the fishery is in danger of depletion of spawning stock in the rivers or the ocean. There are other areas where the fishery is predominantly in the State zone at this point in time.

There is a difference of opinion on the council role in this. There is a fear of very rapid exploitation in some fisheries. The councils are being pushed by their constituents to prepare a management plan so as to avoid proliferation of fishing effort quickly into one of these fisheries. That is pushing the system.

There are several excellent examples on the east coast—white bass, bluefish, menhaden—where the fisheries are now predominantly in State waters, yet the public says they need management. In fact, they do need management. They are interjurisdictional in nature. They move up and down the shoreline, into internal waters, and the council is being pressured to bring these under management.

The **Chairman**. Senator Stevens.

Senator **Stevens**. Well, do you see a lack of planning in the development area? Take our area that I was talking about before, which says that the vast surplus of protein base is unharvested, plus the tremendous foreign impact on it now. Would you support a concept to permit the design of a development plan for harvesting that capability domestically would involve the councils and the industry and the State involved and the National Marine Fisheries Service, so that the plan could identify the impediments to development and try to coordinate all of the functions of government and industry in the United States to see if we could accelerate the development of domestic effort in areas like that.

Mr. **Gordon**. I think that is an extremely worthwhile effort. I have long advocated the council's involvement since they came into being, that we owed it to the American industry or to the foreign industries for that matter, to have a long-term horizon in which we know where we want the American industry to go, and they know where they want to go, and the foreign governments understand where we want to take our industry, and where our industry is headed. The foreigner can then plan for rational withdrawal of his vessels in solving their social problems and the like—what they do with their fishermen if we replace them. We must rationally plan for the expansion of our fisheries by making sure we have an adequate trained labor force, adequate risk capital is available, the right type of vessel, the right type of processing line, and the right type of marketing infrastructure. Yes, I certainly endorse that sort of undertaking as being done.

I think, in part, it is now coming into fruition. The councils are recognizing the idea of identifying development opportunities. All of them have not done so yet. The fisheries development foundations, which are increasingly being supported by the industry, are beginning to build that knowledge of the infrastructure and to rationally plan for the future. Our own agency has defined where we want to be in 1992. We are beginning to develop longer range planning strategies to guide ourselves. We will share that with the industry and get their input into it, and with the States. I think we desperately need what you are referring to, to identify the impediments or whatever else is the problem, and see what can be done about it. Sometimes the only thing that needs to be done about it is to change the institutional climate in which the industry is asked to operate.

Senator STEVENS. Well, I think that the foreign fleets have a plan, at least we seem to think that in Alaska. I see the ever-encroaching squid fishery as it comes farther east toward our southeastern fishing zones, and they seem to have a plan for cod. They certainly have their plans for pollock. There is an incessant demand, an increasing number of demands on king crab and tanner crab fisheries. We do not seem to have the same capability to develop aggressive plans to move domestic fishing effort into the same areas, and as a consequence, I think we are losing control once again over the gear problem.

We have the problem again of the marauding, abandoned monofilament nets. I think the Senator from Oregon will recall we had this battle quite a few years ago.

The CHAIRMAN. The fish net import bill, and the texture of what they were made of?

Senator STEVENS. That is right, yes. But now, where this foreign fishing vessels suspect that they have been identified by the Coast Guard as being in the wrong zone, they just cut their nets and let them drift. We have had more and more reports of these nets being cut loose and abandoned, and it is the kind of net that our people cannot use, as you know.

Now, what can we do to try and get some control over at least their gear if they are going to be in our zone, and over what they do with their gear?

Mr. GORDON. Well, what is occurring in the Pacific Ocean with squid is perfectly predictable. We squeezed them on the east coast in terms of access to the squid resources, and they need squid for their marketplaces. So they have simply moved to develop fisheries that are on the high seas. That is, outside of 200 miles. And since those resources do not know where the 200-mile limit is, I am sure they do move in and out. There has not been much interest in the United States to develop the squid resources of the open ocean.

I think we have every right and opportunity within our 200-mile zone to establish seasons, the type of gear and so on that can be used there. Beyond that, that requires an international forum to address what type of gear is appropriate. Lost phantom fishing gear is becoming a major problem both in our zone and external to it, whether it is deliberately abandoned or accidentally abandoned.

Senator STEVENS. I do not want to belabor it, but when I was in the Southeast I ran into the question of the number of salmon that had been marked by these nets. And I asked the Coast Guard to go take a look and see if there were vessels in that area. They searched the area, they could not find any vessels. The fishermen kept telling me they knew that the salmon had been intercepted by foreign fishermen because they were marked by these nets.

Well, it was about, I think, a month later we discovered someone intercepted one of these nets and it was obvious that the salmon was being caught up in these drifting nets, and, gentlemen, the salmon to a great extent that is coming back into Washington or Oregon, as much or more so than the Alaska salmon, is being impacted as they come back from that intermingling zone by these drifting, marauding phantom nets.

I do not know what the answer to it is. Unless we can find some way to require them, if they come into our zone, to tag every so many feet of their net or somehow or other, so we can pin those nets on some vessel—go after them in international ports, go after them and seize everything they have in the zone or do something, because I am telling you they are going to destroy the salmon resources of the Pacific Northwest and Alaska if they keep up this marauding net thing, and they care coming from fisheries like the squid fishery and cod fishery.

They say they are not trying to get salmon, but they are having a tremendous impact on salmon in the southeastern part of Alaska.

Mr. GORDON. Yes. This particular fishery which you refer to is being aggressively pursued outside of our 200-mile zone by the same types of gill nets that would be used for salmon in our zone or outside in the convention area. The prevailing ocean currents that affect that particular area, if they are lost, would bring them inside of our zone. They are going to continue to "fish" because they do not degrade, and as I said, it is becoming a major issue dealing with this phantom fishing gear.

Senator STEVENS. Thank you, sir.

The CHAIRMAN. Good. I have no more questions. Do you have any further?

Senator STEVENS. My other question would be is there any way we can pursue this and find some way to require that the nets of this kind must be tagged if they are to be used in any way where they could impact our zone?

Mr. GORDON. We are now moving ahead to consult regarding fisheries that are outside. The United States has an interest outside as well in the albacore area. They, too, may be using gear that is detrimental, so we must look at their interest as well.

The Hawaiian fishermen are concerned about this Japanese high seas fishery, so we are consulting with some of these governments. I would hope that we can find a solution in that consultation process. If we need legislative action we will be back to you.

Senator STEVENS. Thank you.

[The statement follows:]

STATEMENT OF WILLIAM G. GORDON, ASSISTANT ADMINISTRATOR FOR FISHERIES, NATIONAL MARINE FISHERIES SERVICE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE

Mr. Chairman and Members of the Committee: I am pleased to appear before you today to discuss proposed amendments to the Magnuson Fishery Conservation and Management Act (MFCMA), the fiscal year 1983 budget for the National Marine Fisheries Service (NMFS), and certain other matters.

Before highlighting some specific MFCMA accomplishments, let me take this opportunity to describe the wide range of NMFS' activities that benefit commercial and recreational fishing interests and the Nation.

The MFCMA established exclusive United States management authority over virtually all living marine resources within 200 miles of the coastline of the United States.

The coastal States are responsible for conserving and managing the recreational and commercial fisheries within the boundaries of the States. State fishery programs for these fisheries are coordinated by Interstate Marine Fisheries Commissions while the eight Regional Fishery Management Councils established by the MFCMA are responsible for developing fishery management plans for the foreign and domestic fisheries in the Fishery Conservation Zone (FCZ) which extends from State boundaries to 200 nautical miles seaward from the coastline of the United States. Fisheries which extend beyond the exclusive jurisdiction of the United States and highly migratory species of tuna are managed by international organizations under treaties and international agreements. NOAA supports the conservation and management programs of these State, regional and international organizations through a wide range of operations.

NOAA has supported efforts to expand U.S. fishery exports and joint venture sales. These efforts include eliminating or reducing foreign trade barriers through the "Fish and Chips" policy linking increased trade and development opportunities for U.S. industry to foreign fishing allocations. We currently have fishery trade agreements with Japan, the Republic of Korea, Portugal, and Spain, and expect additional agreements in the future. We have assisted in the development of joint venture investment in America's fisheries and brought U.S. seafood processors and products overseas with notable success.

NOAA monitors significant fishery activities in some 50 foreign countries to determine their effects on U.S. interests. Information on foreign fishing practices and the fishery policies and programs of foreign governments is acquired through a review of technical literature, discussions with foreign and international fishery interests and agencies, and communications with U.S. diplomatic officers. Foreign fishing within the U.S. FCZ is also assessed. This information is used by NOAA and the Department of State in negotiating and implementing international fishery agreements and in making allocations of surplus U.S. fish to foreign nations. The process of NOAA coordination with the Department of State is continuous, and is supplemented by NOAA participation in numerous negotiations with representatives from foreign countries and international fishery commissions throughout the year.

NOAA also provides the Regional Fishery Management Councils with technical, administrative, and financial support to assist them in developing, monitoring, and amending fishery management plans. NOAA reviews the management plans developed by the Councils to ensure compliance with the MFCMA and implements these plans through the promulgation of regulations. NOAA also provides technical and financial assistance to the coastal States to conserve and manage fisheries within waters under State jurisdiction and to participate in the activities of the Regional Fishery Management Councils under the MFCMA.

Under the Mitchell Act (16 U.S.C. 755-757), NOAA assists the states of Oregon, Washington, Idaho, and several Federal agencies in the conservation of the anadromous species of the Columbia River by providing financial and technical assistance to several salmon facilities in the Columbia River basin, and by conducting investigations, surveys, and stocking operations. In the 1983 budget NOAA will support a total of 14 hatcheries and rearing ponds, over 600 fish screens at water diversions, and the operation and maintenance of 86 fish passage devices. Since 1949, over $113 million has been spent in construction of hatcheries and fishways, stream clearance activities, maintenance and operation of facilities, research, and on pollution abatement at the hatcheries. Activities under the Mitchell Act have increased the runs of salmon from a low of about 10 million pounds annually in the 1960s to approximately 30 million pounds currently. Consistent with the Administration's commitment to returning to the States programs of direct benefit to them, a three-year phase-out of NOAA financial support of these activities has been proposed to begin in fiscal year 1983.

The Marine Mammal Protection Act of 1972 (MMPA) established a national policy for protecting and conserving marine mammals by imposing a moratorium, with certain exceptions, on the taking or importation of these animals or their parts, and trading in products derived from them. NOAA administers the moratorium and develops and implements procedures to reduce the mortality of marine mammals during commercial fishing operations. NOAA shares responsibility for implementing the MMPA with the Department of the Interior and is responsible for more than 100 species of marine mammals worldwide including whales, porpoises, seals, and sea lions. NOAA issues permits for the taking or importing of marine mammals and conducts public hearings on these permit applications. Approximately 60 requests for new permits are acted upon each year and approximately 260 active permits require annual monitoring. NOAA also participates in numerous international negotiations conducted under several international agreements dealing with marine mammals.

NOAA is also responsible for the management, conservation, and restoration of most of the marine mammals, fish, reptiles, and invertebrates which are listed as threatened or endangered species under the Endangered Species Act of 1973 (ESA). As of March 31, 1982, 16 marine species were listed as endangered and three as threatened under the ESA. Through interagency agreements, NOAA cooperates with the Department of the Interior in listing, protecting, and controlling the importation of threatened or endangered marine species into this country. As of March 31, 1982, NOAA has initiated over 3,782 investigations since the inception of the ESA. NOAA also administers regulations; reviews state laws, regulations, and management programs for compliance with Federal regulations; monitors certificates which allow limited interstate commerce in certain whale oil and scrimshaw products; and reviews applications for scientific research and propagation permits.

NOAA currently supports administration of the Pribilof Islands, as authorized by the Fur Seal Act of 1966. This support includes the maintenance, operation, and repair of Federal facilities on the Islands, such as fuel oil storage and delivery, and electrical power providing community services, generation plants, and the operation of the seal harvest and initial processing of skins. Employment in this program provides over 70 percent of all earned income on the Pribilof Islands. The Administration is proposing a four-year phase-out of NOAA administration of the Islands beginning in fiscal year 1983 because the program is more appropriately administered by State and local entities.

NOAA provides Federal agencies with information and recommendations concerning the environmental effects of numerous proposed developments and projects which affect the fish populations and habitats of commercial and recreational value. Federal licensing, permitting, and constructing agencies are required, under the Fish and Wildlife Coordination Act, to consult with NOAA concerning the impact of their proposed actions on fish and wildlife habitats. NOAA provides these assessments under authority of the Fish and Wildlife Coordination Act, the National Environmental Policy Act of 1969, the Clean Water Act of 1977, and other Federal legislation. Typical subjects for NOAA review are: construction projects by the Bureau of Reclamation; projects requiring Corps of Engineers' permits for dredging and filing to create industrial and residential waterfront property; projects requiring Federal Energy Regulatory Commission licenses for hydroelectric power plant construction; and projects requiring Environmental Protection Agency discharge permits. From 1974 through 1981, NOAA reviewed over 89,000 permit applications issued by the Corps of Engineers. Each year, NOAA reviews approximately 10,000 applications proposing alteration of about 20,000 acres of the Nation's coastal and nearshore marine environment. NOAA also reviews and provides technical assistance on fisheries matters important to State coastal zone management plans, special area management plans, proposed marine and estuarine sanctuaries, coastal energy impact grants, and Outer Continental Shelf oil and gas exploration and production activities.

NOAA enforces regulations under the MFCMA, the MMPA, the ESA, and other Federal fish and wildlife regulations relating to living marine resources. NOAA enforcement agents participate in Coast Guard patrols to ensure that fishing vessels are operating in accord with the requirements established under the MFCMA and those necessary to carry out the provisions of international treaties. The foreign fisheries surveillance and enforcement activities are also planned and conducted in cooperation with the Coast Guard, which provides aerial and surface patrol craft. NOAA also charters aircraft to supplement the Coast Guard's effort. These actions reduce the illegal exploitation of fishery stocks and fishing gear conflicts with foreign vessels, and ensure that American fishermen have preferential access to fishery resources in the FCZ. Surveillance activities, along with vessel surveys, provide information concerning catches and fleet movements used for managing domestic and foreign fisheries and in international negotiations. NOAA agents enforce the provisions of Federal laws and treaties designed to protect living marine resources and prevent illegal importation or interstate transportation of their products. These efforts include enforcement activities directed toward protecting bowhead whales in

Alaska, humpback whales in Hawaii, and sea turtles in the Caribbean and Southeast United States.

In addition to providing for the balanced conservation and management measures needed to achieve optimum use of living marine resources, NOAA programs are designed to aid the United States in its efforts to realize the great potential for future development and expansion of the commercial and recreational fisheries of the United States. The greatest expansion can occur in fisheries that are now mostly bypassed by domestic fishermen, including Alaska bottomfish, squid, Pacific hake, and Gulf bottomfish. The MFCMA gives United States fishermen first preference to harvest these resources, and declares it the policy of Congress to encourage their development. The American Fisheries Promotion Act reaffirmed this policy and expanded NOAA's responsibilities to promote the full development and use of these resources.

NOAA provides financial services to the fishing industry under Title XI of the Merchant Marine Act of 1936, which authorizes the Fishing Vessel Obligation Guarantee Program; Section 607 of the Merchant Marine Act of 1936, which authorizes the Fishing Vessel Capital Construction Fund program; and Section 4 of the Fish and Wildlife Act of 1956 (16 USC 742(c)), which authorizes the Fisheries Loan Fund program. NOAA partially funds the administrative expenses for carrying out these programs. The balance of the expenses are funded through fees collected under the programs.

NOAA also provides fishery development services and conducts research to assist the domestic industry to gain access to foreign and international markets. NOAA participates in international trade negotiations and in export marketing activities in cooperation with other Federal agencies such as the Department's International Trade Administration and the U.S. Small Business Administration. Information from foreign sources is analyzed and then distributed to Federal and State organizations and the domestic fishing industry to pinpoint overseas marketing opportunities.

NOAA also provides services and conducts research on the safety, quality, and public health impediments to the full utilization of living marine resources under the Agricultural Marketing Act of 1946 (7 U.S.C. 1621-1627). NOAA is also responsible for health standards and sanitation practices in the seafood industry under the Fish and Wildlife Act. NOAA's services and research provide information on the levels and significance of hazardous materials in fish and fishery products, assess the nutritional characteristics, composition, and value of commercial and recreational species, and develop improved methods to preserve the quality of fishery products. NOAA's services regarding product standards, specifications, and labeling assist the industry in producing and marketing wholesome fishery products, properly identified and labeled for domestic and international trade. Consumer and trade education services enhance awareness of the safety, wholesomeness, and high nutritional value of seafoods and reduce or eliminate major impediments restricting the acceptance of unfamiliar species.

An additional responsibility of NOAA is providing timely and accurate information needed for conserving, managing and developing fishery resources for the benefit of the nation.

This information is used by Regional Fishery Management Councils, Interstate Marine Fisheries Commissions, several international fishery commissions, the States, and NOAA as a basis for establishing appropriate population levels and yields of living marine resources and for developing and implementing a wide variety of management measures. It is also used by Federal agencies to assess the effects of proposed developments and projects upon the fish populations and habitats of commercial and recreational value and by public and private decisionmakers to guide the development of the Nation's fishery resources.

To collect information concerning living marine resources NOAA: (1) studies the life histories of various species, including reproduction and growth rates, food requirements, species interrelationships, habitat requirements, and behavioral characteristics; (2) assesses the present status of those stocks which are of significant commercial or recreational value, including their relative abundance, geographic distribution and age composition; (3) forecasts the future status of certain stocks, which involves estimating reproduction potential and spawning success; and, (4) studies the interrelationships and consequences of natural and human-induced changes in the marine environment on the production potential and resultant levels of abundance of living marine resources.

The variability of the marine environment makes accurate prediction of future fishery yields difficult. Environmental events can significantly impact living marine resources during their early life stages which can then drastically affect future harvests. These events may also affect the distribution and availability of stocks in traditional migratory routes, feeding and spawning concentrations, and fishing grounds. To assess and forecast stock conditions, therefore, it is necessary to predict the effects on the marine ecosystem of various natural and human-induced events. NOAA studies the effects of physical changes to marine habitats to determine their impacts upon the abundance, distribution, and physiological functions of those species of commercial or recreational significance. The effects of dams, power plants, effluents, dumping, dredging, and logging on fish are also investigated to identify and lessen the causes of fish mortality and thereby increase the harvest of fish.

NOAA conducts vessel surveys to collect information on the abundance and distribution of juvenile and adult groundfish and shellfish species living at or near the ocean bottom in their harvestable life stage. Surveys also provide information on pelagic fish or free-swimming species that inhabit surface waters and middle depths, which range widely over the oceans and often migrate long distances. Vessel surveys provide statistical samples for determining the characteristics of the population being sampled and permit the validation of data collected from the fishing industry which often reflects economic and fishing strategy biases which may mask actual resource abundance trends. At present, up to nine research vessels of the NOAA fleet are used to gather information concerning living marine resources. Information from vessel surveys is also obtained through contracts and sharing arrangements with States, universities, and private organizations and through cooperative surveys with the States and foreign fleets.

NOAA also collects information concerning the commercial and recreational harvesting, processing, and marketing of living marine resources. This information includes data on: (1) the volume and value of catch by domestic and foreign fisheries by species, region, state and type of fishing gear; (2) the incidental take or harvest of non-target species; (3) fishing effort and costs associated with the catch; (4) economic contributions from domestic and foreign fishing; (5) the volume and value of processed fishery products from domestic harvest and imports; (6) could storage holdings of fish; (7) production of industrial fishery products, i.e., fishmeal and oil; (8) the number of operating units and people in fisheries at both the harvesting and processing levels; (9) imports and exports of fishery products; (10) consumption of fishery products; and (11) the number of marine recreational fishermen and their catches; effort and expenditures. Data are obtained from foreign and domestic fishing vessels, surveys of fishermen, State records of landings and numberous onshore fishery facilities and are collected nation-wide in cooperation with the States and foreign governments and the commercial and recreational fishing industries.

Using the resource and fishery information it collects, NOAA provides the numerous international, Federal, regional councils, and State organizations responsible for conserving, managing, and developing living marine resources with quantitative forecasts of fishery resources, assessments of the impacts of management and development decisions on fishery resources, and a wide variety of consultation and data management services. Much of the resource and fishery data which is collected by NOAA is entered into automated information systems for analysis and dissemination. To improve its ability to provide information on potential fishing yields and the impact of man-induced and natural changes upon fishery habitats and resources, NOAA is increasing its use of computers and is conducting analyses of resource, environmental, and fishery information. NOAA is also developing and improving ecosystem simulation and management decision models to understand the relationship of changes in various ecosystem and fishery systems better.

To return to NOAA's administration of the MFCMA, that Act is fulfilling its promise as the most important and constructive fisheries legislation in the history of the country. We believe we are making major progress in accomplishing the purposes of the Act, to assert U.S. jurisdiction over the valuable renewable marine resources found within 200 nautical miles of our coasts, except for highly migratory species of tuna, and to manage these resources for the benefit of the Nation. The Act has been successful. Foreign fishing, which had contributed to the decline of these resources in the 1960's and early 1970's, has been reduced by 33 percent and domestic harvests have increased by 46 percent between 1976 and 1981. The Act has stimulated investment and expansion of the U.S. fishing industry and promises to reduce the current balance of trade deficit in fishery products. The creation of the Regional Councils has forged a new and productive relationship between the government and user groups which ensures that management decisions will enjoy broad public support.

Let me briefly highlight some specific accomplishments under the Act. Twenty-three fisheries are under management: Eight are under Preliminary Management Plans (PMPs) and 15 are governed by Fishery Management Plans (FMPs). We are presently processing eight additional FMPs and expect them to be implemented by the end of fiscal year 1982. Nine new FMPs are anticipated in fiscal year 1983, six in fiscal year 1984, and four in fiscal year 1985, for a probable total of 42 fully implemented FMPs at the end of the next reauthorization period. The 15 FMPs now in place have been amended a total of 49 times.

In keeping with the desire by the Congress and the Administration to reduce expenditures and to diminish the impact of regulations upon industry and the public, we are reevaluating the FMP process. We see a number of ways in which fishery management can be made more cost effective and efficient. The first is by streamlining the process through increased flexibility and increasing the role of our regional offices in the review and implementation of FMPs. Second, we need to analyze critically to what extent fisheries originally thought to need management stand the test of whether the benefits of Federal regulation outweigh the costs. Third, we encourage the consolidation of FMPs to reduce the number, complexity, and paperwork of the regulations. Finally, we encourage the Councils to look more searchingly at the alternatives for regulating fisheries and choose those that are least burdensome upon fishermen provided, of course, that they meet conservation requirements. I believe that with the experience we have gained we can realistically scale down our original, and perhaps overambitious, view of regulating some 80 to 90 fisheries, to a realistic and practical level. Additional accomplishments are as follows:

Five years of operational experience and rational fisheries management from 1977–1981 has increased the value of our domestic commercial landings from the FCZ by over $400 million, and in quantity by nearly 365 thousand metric tons. The record 1981 value of total U.S. landings of $2.4 billion is almost two and one-half times the pre-MFCMA level. After inflation, this represents a 46 percent "real" gain in value.

We have increased our fishery products exports from $385 million in 1976 to a record $1.2 billion in 1981, thereby helping to slow the growth in the balance of trade deficit. The total imports of U.S. fish and fishery products in 1981 by countries party to a Governing International fisheries Agreement (GIFA) has increased 17.5 percent from 1980.

The U.S. expects to collect approximately $34 million in user fees from foreign allocations in 1982. Under the MFCMA, NMFS will operate a foreign fishing vessel observer program consistent with our understanding of the Congressional mandate. In addition, foreign nations have undertaken considerable research programs in our fisheries, making the results available to us or providing platforms for our research. Foreign nations have also made trade concessions to us, made technology available to our fishermen and opened up new markets for our fishery exports.

Under the MFCMA, joint ventures and over the side sales by American fishermen in 1981 amounted to $21 million—a growth of nearly $13 million over 1980 operations.

Other advances have been made. The working relationship between NOAA and the Councils has gained strength and a greater degree of mutual understanding. We are seeking, with some success, to give the States a greater role in the management of fisheries under the MFCMA.

In summary, Mr. Chairman, we have every reason to believe that the MFCMA will continue to enable the country to benefit from its opportunities with regard to its marine fisheries resources.

With the above as background, it is appropriate that we step back and consider what changes will improve the MFCMA's effectiveness. At the outset, I would like to emphasize that the principles, concepts and procedures in the MFCMA have provided the basis for a good deal of progress in fishery conservation and management and, of equal importance, in directly involving the fishing industry in decisions affecting its well-being. If adjustments are to be made in the MFCMA, we should take care to protect the valuable checks and balances which have contributed so much to its success.

On February 16, 1982, the Department forwarded a letter to the Committee in response to your request for our views on the amendments to the MFCMA proposed in S. 1668. A copy of that letter will be submitted for the record. We subsequently received a Staff Working Draft of another Senate bill and a rough staff draft of amendments to that bill. Because the printed bill was not available to NMFS at the time this statement was prepared, I will be relying upon the Working Draft and the staff amendments in my comments today. I will be pleased to provide more specific comments in writing for the record when we have had an opportunity to review the actual bill.

To simplify my statement, I will address the proposed amendments in order:

(1) Section 201(c) would be amended to require that a foreign Nation's existing and future allocations be reduced if that Nation does not comply with understandings or agreements considered as significant in allocation determinations.

The Department supports this amendment as to future allocations. however the application to existing allocations should be deleted as unnecessary. The current State Department allocations reflect our evalutions of country performance under the criteria of the American Fisheries Promotion Act on a quarterly basis. A determination of a foreign nation's noncompliance with its commitments could be acted on within a reasonable period by reducing future allocations.

(2) Section 201 would be amended by adding a new provision to allow foreign vessels to engage in recreational fishing in the FCZ and inside State boundaries, subject to conditions set by the Secretary and the Governor of the State.

The Department supports this amendment and notes that it has been modified in response to our earlier comments. The change clarifies Congressional intent not to include foreign flag charter vessels within this exception. We understand the new language—"vessels which are not operated for profit"—would exclude from the exception recreational fishing by crew members of foreign flag merchant vessels.

(3) Section 204(b) would be amended to strengthen the compliance role of U.S. observers aboard foreign fishing vessels and to establish a revolving fund for observer fees.

The Department supports this Congressional recognition of the increasing importance of the compliance aspects of observer data, and we support removing the observer fund from the Congressional appropriations process. As a technical matter, this proposed amendment would more suitably be directed to Section 201 rather than Section 204.

(4) Section 302(a)(8) would be amended to provide for representation of the Northern Mariana Islands on the Western Pacific Council; to increase the number of voting members to 13; and to clarify the geographic area of Council jurisdiction.

The Department supports this amendment. The changes to the Staff Working Draft which have been provided to the Department give the Council jurisdiction over all FCZ fisheries in the Western Pacific, not just those seaward of its member States, and resolves the question of who manages the fisheries seaward of nonmember States.

(5) Section 302(b) would be amended to update the appointment process for voting members of the Councils and to require that the Secretary make a public announcement of each appointment not less than 45 days before the first day on which the individual is to take office.

The Department supports this amendment as it would afford a brief overlap between outgoing and new Council members. As a technical matter, however, portions of the amendment as drafted would appear to be repetitive of Section 302(b)(1)(C).

(6) Section 302(b) would be further amended to grant the Secretary the authority to remove Council members for cause.

The Department supports this amendment. We assume that the successor to any such member so removed would be appointed in the same manner as the original member and that the successor would be initially appointed only for the remainder of the removed member's term.

(7) Section 302(h)(1) would be amended to provide an elaborate mechanism for the Council to justify its decision to manage or not to manage a fishery, and for the Secretary to review that decision.

The Department opposes this amendment as unnecessary. Present procedures accomplish the same purpose. The initial decision whether to develop a fishery management plan belongs with the Council. If the Council believes Federal management is necessary, it submits a work plan for the Secretary's approval. This requirement began under Executive Order 12044 and has been continued to ensure that regulations implementing the FMP will comply with E.O. 12291.

If this amendment is retained, we have several suggestions for improving it. First, there is no reason to require a Council to submit justifications for deciding not to manage some of the many fisheries in its area of authority. If the Secretary becomes aware of a fishery in need of Federal management, he may so inform the Council; if the Council fails to submit a plan after a reasonable period of time, he may prepare his own plan under Section 304(c).

Second, if the Secretary wants public comment on a Council decision to prepare or not to prepare a plan, he could solicit it by publishing an advance notice of proposed rulemaking or by holding a hearing. The requirement to publish each justification is unduly burdensome.

Third, if the public comment period of 30 days is retained, the Secretary must have more than 45 days to review the Council determination and consider the public comments. We suggest a total of 90 days.

Finally, the proposed Section 302(i)(2) is not clear as to the effect of the Secretary's failure to disapprove a Council determination that a fishery management plan is needed. We suggest substituting for the last clause the following: "the Council may proceed with development of a fishery management plan."

I note that one change to Section 302(h) in S. 1688 was not covered in the Staff Working Draft. That change would have allowed a Council to hold hearings outside its geographical area of authority, when appropriate in developing a fishery management plan. We believe this change would be helpful, especially for the North Pacific Council.

(8) Section 302 would be amended to add a provision for Council comment on activities affecting fishery resources.

The Department opposes this provision as unnecessary. Some Councils already comment on environmental actions that may affect fisheries in their areas. We do not believe that Federal agencies should be required to respond to such comments.

(9) Section 302 would be amended by adding a provision substituting public-participation procedures for the requirements of the Federal Advisory Committee Act.

The Department does not see a need for this amendment.

(1) Sections 303(b) and 304(d) would be amended to authorize limited-access fees for domestic fishermen in excess of administrative costs, and to allow establishment of a vessel "buy-back" program funded by such fees.

The Department opposes this amendment. We do not believe that it should be the responsiblity of the Federal Government to administer this proposed vessel "buy-back" program. We are trying to encourage the States to assume greater responsibilities and to cooperate with us in fisheries management. The proposed program is logically a State activity since the vessels are under the jurisdiction of the States.

(11) Section 303(c) would be amended to require that any plan or plan amendment include proposed regulations which shall be considered a part of the plan or amendment, and that these regulations be submitted to the Secretary with the plan or amendment.

The Department strongly supports the requirement that the Councils submit proposed regulations with plans and amendments, as such regulations can serve as a useful device to identify the strengths or weaknesses of a plan or amendment and to avoid ambiguities in interpretation. However, if the regulations are considered part of a plan or amendment, it might appear to be necessary to disapprove the plan or amendment in order to modify any part of the regulations. Since this would be inconsistent with our mutual interest in a more efficient plan review process, we suggest the requirement that the proposed regulations "be a part of the plan or amendment" be deleted.

(12) Section 303 would be amended to provide that a Council may request the Secretary to implement a data collection program of additional biological resource information to determine whether a plan is needed or to prepare a plan.

The Department opposes this amendment. It would unnecessarily expand the burden on the fishing industry for the submission of data.

(13) Section 304(a) would be amended to presume Secretarial approval of an FMP or amendment, unless partially or wholly rejected in writing within 60 days of its receipt.

This and other amendments address the concern of the Committee with the lengthy and cumbersome nature of the fishery management process, much of which results from the requirements of applicable law. Everyone agrees that fishery management needs to be rapidly responsive if it is to be effective. We too have been concerned with this almost since the Act went into effect. In 1979 we held workships with the Councils to explore improved ways of doing business. Since then we have actively pursued means of improving and speeding up the process. The approach to accelerating the process taken in the Staff Working Draft is to require "dates certain" by which some of the Secretary's actions under the Act will be taken, and to remove the burdens imposed by other legislation.

While I sympathize with this approach and completely agree with the concern it represents, it may accelerate the process at the expense of diminishing the protections that Congress provided for the public in the Regulatory Flexibility Act, the Paperwork Reduction Act, the Administrative Procedure Act and other legislation. I believe that a fishery management plan should be developed with adequate time for public review and comment and for the Secretary of Commerce to ensure that public concerns have been properly addressed.

I do not believe it is in the public interest to shorten the review process to the extent proposed. Nor do I think there is a need for such limitations. As this Committee knows, I believe that by the use of framework plans we can satisfy the public need and, at the same time, make the timely annual and inseason changes needed for effective management without using the lengthy amendment process. But such a process must be based upon well designed plans and regulations that have been given full public and Secretarial review. We will shortly send out an informal guideline for preparing framework plans that was prepared jointly by Council and NMFS Staff. I believe that this approach can serve the public and fishery interests better than by saving a few weeks in the review and regulatory process.

While timely fishery management is our mutual goal, 60 days is not sufficient time for an adequate review of all proposed plans, amendments and regulations and the Administrative Record. The period of time specified for Secretarial review must take into account the time needed for analysis of new issues and for addressing the concerns of industry and others raised during the review process. If a specific review period is required, we believe it should be at least 120 days for the initial submission and 90 days for any revised submission. We prefer an amendment which would treat the Secretary and the Councils as partners in developing plans and regulations. This approach is discussed in detail in our letter on S. 1668.

(14) Section 305(a) would be amended to require the Secretary, as soon as possible after receipt of a plan or amendment, to publish in the Federal Register a notice of availability of the plan or amendment, and to allow a 30 day public comment period.

The Department supports this amendment, but believes that it should be expanded to provide for publication in the Federal Register of the proposed regulations prepared by the Council, with any revisions by the Secretary, and an explanation of substantive Secretarial modifications.

(15) Section 305(b) would be amended to require that the Secretary promulgate regulations immediately after a plan or amendment goes into effect, and that such regulations shall enter into effect 30 days after promulgation.

The Department supports the thrust of this amendment and are confident its requirements can be more efficiently met if tied to the requirement that the Councils submit proposed regulations with plans and plan amendments. We suggest, however, that the amendment be modified to require the Secretary to promulgate "regulations to implement the plan or amendment", rather than "regulations which are part of the plan or amendment." This suggestion is consistent with my earlier suggestion that the plan and the proposed regulations be separated to simplify the entire process.

(16) Section 305(e) would be amended to change the Magnuson Act's emergency provision in several respects.

Because the precise language of this amendment was not available to the Department when this statement was prepared, I will confine my comments to general views on the intent of the amendment as expressed by Committee staff.

The Department supports amendment of Section 305(e) to broaden the circumstances justifying emergency action to include non-resource reasons. Many non-resource problems arise in fisheries which need urgent attention to avoid harm to both fishermen and processors. Amendment of Section 305(e) to permit consideration these non-resource problems would be a positive step.

As for who should determine whether an emergency exists, the present provision, which assigns this authority to the Secretary where a management plan exists, is preferable because it assures a National perspective. Where no FMP exists, any procedure proposed to permit the promulgation of emergency regulations must recognize that information is needed to determine: whether an emergency does, in fact, exist; what regulations are appropriate to deal with the situation; and whether they are the most effective and least burdensome means to accomplish the desired effect. If emergency regulations were promulgated, absent the degree of data collection and analysis which is involved in the preparation of a plan, the potential for error is magnified and the effects on the resource and the fishing industry may not correspond to that which is intended. In short, we need to be very careful in amending the Act in this area.

(17) Section 305 would be amended to exempt certain provisions of the Act relating to time limitations and the taking effect of regulations from certain provisions of the Paperwork Reduction Act, the Regulatory Flexibility Act, and E.O. 12291.

The Department strongly opposes this amendment because it is contrary to our efforts to minimize regulatory burdens. We understand the frustrations of the Councils with the lengthy FMP approval process, but we believe the Department's commitment to streamlining its administrative procedures is preferable to exemption from important regulatory reform measures. However, we would be willing to work with the Committee to consider whether amendments could be drafted which would incorporate the essential elements of the Regulatory Flexibility Act, the Paperwork Reduction Act and E.O. 12291 into the management plans.

(18) Section 306(a) would be amended to clarify authority for fishery management within the Federal enclaves of the FCZ.

The Department supports this amendment and believes it will aid both the Federal Government and the States in our mutual objective of sound fishery conservation and mangement.

(19) Section 309(b) would be amended to alter the criminal penalty provisions of the Act.

The Department supports this amendment. It will bring the United States into accord with customary international law and place us in a better position to call on other Nations to avoid imprisonment of our own distant-water fishermen.

(20) Section 307(2)(A) would be amended to exclude recreational fishing permitted under Section 201 from the prohibition against fishing within the boundaries of any State or the FCZ by vessels other than vessels of the United States, subject to certain conditions.

The Department supports this amendment as it makes Section 307(2)(A) consistent with the proposed amendment to Section 201.

(21) Section 301(a) would be amended to authorize the Secretary to seize the fish, or the fair market value thereof, taken, or retained in violation of the Act.

This amendment would permit the Secretary to use the civil forfeiture provisions of the statute, and forego the necessity of reducing the fish to possession. This practice has created delays and resulted in needless spoilage of perishable fish because the Government lacks appropriate storage facilities. The Department supports this amendment.

(22) Section 302(h)(4) would be amended to delete the requirement that the Council submit a report on Council activities to the Secretary by February 1 of each year; Section 311(a) would be amended to delete the requirement that the Secretaries of Commerce and the Department in which the Coast Guard is operating report semiannually to Congress and the Councils on the degree and extent of compliance with the Act.

The Department supports these amendments as being consistent with the Administration's budgetary efforts to curtail reporting requirements.

(23) Section 2(c) of the Atlantic Tunas Convention Act of 1975 would be amended to establish a revolving fund for observer fees.

The Department favors the creation of a revolving fund for observers aboard foreign fishing vessels, but does not support the creation of two separate funds. We believe it would be preferable to have one revolving fund which would receive and disburse observer monies under the Magnuson Act and the Atlantic Tunas Convention Act. The Department recognizes that this may require certain technical amendments to these Acts and elimination of the two special observer funds which now exist.

(24) Section 406 would be amended to authorize certain appropriations for fiscal years ending September 30, 1983, September 30, 1984, and September 30, 1985.

The Department opposes the authorization levels contained in this amendment. The Department's views on appropriate authorization levels were transmitted to the Senate on March 17, 1982. In that transmittal, the Department proposed authorizations of $41,605,000 for the fiscal year ending September 30, 1983, and such sums as may be necessary for the fiscal years ending September 30, 1984 and September 30, 1985.

In addition, the Administration believes that the States and the private sector are in a position to assume greater responsibilities in certain programs. For this reason, the Administration is not seeking reauthorization of: (1) the Central, Western and South Pacific Fisheries Development Act; and (2) the Anadromous Fish Conservation Act, except that, with respect to the Striped Bass amendment, we defer to the Department of the Interior.

I would like to conclude my statement with a few comments on future plans for the fishery programs of NOAA. We are now taking steps to streamline our activities and make the best use of available resources to assist in implementing the President's program and carry out NOAA's basic mission. That mission is to provide services; perform the applied and fundamental research necessary to support those services; and to manage the Nation's oceanic and atmospheric resources for which NOAA has statutory responsibility. Toward this end, NOAA is developing a long-term plan to help us pursue our mission in the next ten years. This plan will focus on where we are, where we want to be in the 1990s, and how we can get there.

NMFS is participating with other elements of NOAA in developing this long-term plan.

We in NMFS are undertaking other initiatives which will help us do our job better in the days ahead. These include a proposed reorganization designed to (1) reduce overhead; (2) improve internal management effectiveness; (3) better balance program accountability and authority; (4) more effectively monitor program progress and accomplishments; and (5) allocate a greater portion of our resources directly to the products and services for which we are responsible.

Other efforts to make more effective use of our resources will focus on strengthening our partnerships with other Federal agencies, the States, the commercial and recreational fishing industries, conservation groups, and our other constituents in seeking innovative approaches in conducting our fishery programs.

The fiscal year 1983 budget request for NMFS proposes a base budget level of $106.7 million to fund essential ongoing program activities. This request fully supports the President's efforts to reduce the overall level of Federal expenditures; eliminate low-priority activities; and transfer certain Federal programs to States, local governments, or the private sector, where appropriate.

I would like to take a few moments now to discuss some of the significant program changes proposed in the budget and the future directions of major NMFS programs and activities which take into account reduced levels of spending.

Our conservation and management activities will focus on continuing essential stock assessment services, maintaining essential fishery information services, and managing only those fisheries in need of management, with emphasis on resources for which the Federal government has clear responsibility. This focus will minimize the budget and manpower required to manage the fisheries while at the same time conserving the resource, minimizing procedural requirements, and lessening burdens on the industry.

Stock assessment and population analyses are essential to develop and maintain viable U.S. fisheries. Precise and timely information from stock assessment and population analyses will help make it possible for fishermen to evaluate the economic feasibility of harvesting different species. These feasibility analyses in turn will produce economically viable fishery planning which will contribute to the evolution of a healthy industry. Also, knowledge of stock abundance and dynamics is critical if we are to preserve our options for the future. For this we are requesting approximately $30 million in fiscal year 1983.

As part of our management efforts, we will ask the Regional Fishery Management Councils to examine closely which fisheries should be managed through regulations. This choice involves factors such as which fisheries are in the greatest need of management in terms of economic importance and condition of the stocks, whether the benefits of regulation would outweigh the costs, and whether a Federal role or a Federal-State partnership is warranted. This examination will be critical if we are to use available resources in the most efficient and effective manner.

Another major emphasis will be to encourage the consolidation of present FMPs, to cover larger numbers of species over a broader area, and the adoption of multiyear plans which remain in place until amended. This will reduce the number of regulations and generally increase governmental efficiency in management. We are also improving the management process through the revision of the guidelines that interpret the seven National Standards provided for in the MFCMA. The guidelines that we will soon propose are intended to provide clearer, more comprehensive guidance and a better understanding of the basis for FMP review and approval.

Current examples of our efforts to improve the quality of fishery management are the New England groundfish and the Alaska king crab fisheries. The Secretary recently approved an interim Groundfish Plan which provides a streamlined management system involving a less restrictive and less complex regulatory regime that should be more efficient in achieving its objectives and more effectively enforced. The industry reaction is positive and with this plan we expect to acquire through voluntary industry efforts vastly improved fishery data needed for adequate stock assessments. The interim plan also lays the groundwork for long-term, comprehensive management of the entire demersal finfish complex in the area.

The North Pacific Fishery Management Council's proposals in the King Crab FMP would delegate substantial day-to-day management and enforcement authority to the State of Alaska subject to approved criteria and certain checks and balances. This type of arrangement would take advantage of local expertise and conditions, while maintaining the National Standards and other requirements of the Magnuson Act and providing Federal savings.

To support our management efforts, we are requesting $9.4 million to provide basic economic and statistical information about our fisheries. We are requesting

$36.3 million in other fishery management areas. These include the Columbia River and State-Federal programs, international fishery management, marine recreational fisheries and the observer program.

We will continue to emphasize regulatory reform. In response to the Administration's effort to reduce burdensome regulations on the industry, we are examining not only many of our own regulations, but also those of other government agencies in an attempt to eliminate those that are unnecessary and to moderate those that may be needlessly restrictive. We are also carefully considering requirements of other Federal laws, such as the Regulatory Flexibility Act, the Paperwork Reduction Act, and Executive Order 12291, which are meant to shield businesses and the Nation in general from unnecessary or burdensome Federal regulation.

Selected areas of fishery utilization and development will continue to be high priorities. However, there will be a greater requirement for industry to assume certain responsibilities and provide associated funding. The government's role will be primarily that of a catalyst in creating an atmosphere in which the industry can thrive and expand. The government will continue to perform certain activities that the industry cannot do, such as international trade negotiations, export marketing, and product quality and safety services. We are requesting $2.7 million for these activities in fiscal year 1983.

With these funds we will strongly pursue our "fish and chips" policy in making allocations to foreign nations fishing in our FCZ. This policy, which was formalized by the American Fisheries Promotion Act, provides that in making foreign allocations, the U.S. take into account whether and to what extent foreign nations impose trade barriers on U.S. fishery products, cooperate with the U.S. in the advancement of fisheries trade, and contribute to the growth of the U.S. fishing industry. These criteria are in addition to those prescribed originally in the Magnuson Act.

We will continue to focus on trade and export market development, but we will rely more heavily on the International Trade Administration and the Department of Agriculture in support of these activities. One of the problems the U.S. industry has is a lack of knowledge of the regulations and product specifications of foreign countries, particularly new countries and products that it has not traditionally been involved with. To help accelerate industry efforts, we are in the process of compiling, translating, and analyzing these regulations and product specifications. As they become available we will publish and distribute the information to the industry on a cost reimbursable basis. The information will also be used as part of a new training package we are putting together for our seafood inspectors.

We will also continue essential research, such as seafood safety studies in support of our voluntary seafood inspection program. This program is a good example of a successful, self-supporting program that is paid for by the businesses that subscribe to the services. We intend to meet future demand for our inspection services primarily through use of cooperative inspection agreements with the States. These agreements provide for training and crosslicensing of State inspectors.

We will continue to seek innovative ways to work with the industry and others to carry out fishery programs. Project "Catch America," for example, represents a cooperative effort between the seafood industry and the government to serve the public and expand the industry. This was accomplished by (1) providing consumers and retailers information on the many available fishery products and methods of preparation and handling, and (2) strenghtening and developing supply networks that the link the harvester, processor, distributor, and retailer. We anticipate that after this year, the "Catch America" network will continue without the need for substantial Federal funding or involvement.

We will also endeavor to better integrate our fishery management and development programs whereby our management efforts complement industry development activities. For example, fishery managers, when reviewing resource surveys, can identify opportunities for development. In this way, fishery management becomes a forum for identifying development opportunities as well as fulfilling necessary regulatory roles.

Our efforts to assist the fishing industry through support of joint ventures between the domestic industry and foreign countries will be continued as an interim measure pending development of full domestic utilization. These primarily involve "over-the-side" sales of non-traditional species by domestic harvesters to foreign processing vessels. To date, joint ventures have generally served domestic fishermen well. They have provided economic opportunities, transferred certain technologies, and provide the type of knowledge and incentive necessary to develop a wholly domestic use of the fishery resources in the FCZ in the near future. Of course, as domestic processors develop the capacity to handle the domestic catch, joint ventures of this type will be gradually phased out.

Funds raised under Federal auspices in 1981 absorbed 43 percent of the capital raised in the non-financial sector of the U.S. credit market. As part of the government-wide effort to reverse this trend and increase the amount of private credit available to business, reductions are being proposed in credit programs. As part of this government-wide effort, obligation guarantees under the Federal Ship Financing Fund for fishing vessels would be limited to $25 million in fiscal year 1983. The fishing industry will benefit more from the Administration's effort to stabilize financial markets, reduce interest rates, eliminate burdensome regulations, and lower inflation than from direct Federal assistance. Furthermore, we will contine to assist the fishing industry through our tax incentive programs such as the Capital Construction Fund. We also anticipate that our claims programs will be continued at levels required to meet the needs of the fishing industry. We are requesting $3.0 million in fiscal year 1983 for our claims programs and financial services.

Marine recreational fisheries and the industries dependent on them will likely receive more attention in NMFS' programs. This is a result of the growing importance of marine recreational fishing to the economy of the Nation, in addition to the aesthetic value already recognized. Marine recreational fisheries are also important in our fishery management considerations because of the large number of marine recreational fishermen and the magnitude of their catch. NMFS has adopted a new policy that will more fully integrate marine recreational fisheries throughout its major programs and activities. NMFS is currently working with the U.S. Travel and Tourism Administration and the Sport Fishing Institute regarding development of recreational fishing information of interest to foreign tourists visting the U.S. The information, printed in five languages, would tell foreign fishermen about what, when and where different types of fishing can be found. It would also advise them of licensing requirements, and other necessary information.

We will continue basic research and management programs for the protection of marine mammals and endangered and threatened species for which NOAA has statutory responsibility. However, we hope to realize some savings in these programs through strengthening our partnerships with the States. For example, we anticipate that management responsibilities for some marine mammal species will be returned to the State of Alaska. This will be facilitated by virtue of the recent amendment to the Marine Mammal Protection Act which clarifies and simplifies the mechanism for returning management authority to the States. We will be able to reduce our enforcement presence in Alaska through a cooperative agreement with the Alaska Eskimo Whaling Commission. Furthermore, the Eskimos are now funding much of the field research on bowhead whales that we had been doing. We will also be able to improve our management effectiveness in protecting sea turtles in the Southeast by virtue of the development of a trawling efficiency (turtle excluder) device which is expected to greatly reduce mortality of sea turtles caught incidentally in the shrimp fishery. Altogether, we are requesting approximately $15.0 million for our efforts to protect marine mammals and endangered species.

We anticipate better integration of our habitat conservation activities with fishery management and development needs in recognition of the requirements for balanced multiple use of all the Nation's marine resources. In this regard, we will continue to provide essential research and support services necessary to influence multiple use decisions regarding the marine environment. We are examining ways to simplify and streamline our permit review process through joint permit review with other government agencies. This will involve multiple agency screening of permits to narrow the focus on the highest priority or precedent-setting issues. Our Northeast Regional Office has successfully implemented this joint permitting process and we are assessing its application in other regions as well. In the Northeast Region we are also examining techniques to identify the most critical marine resource habitats and focus our resources in those areas. This prototype is being studied in other regions. Altogether, we are requesting $6.4 million to support our habitat investigations work and an additional $3.9 million for our environmental impact analysis services.

In summary, there will be changes in the way NOAA does business. We are looking at all of our activities and responsibilities in a new light, and with the creativity born of necessity. Collectively, the Federal government, the States, the commercial and recreational fishing industries, conservation groups, the academic community, and our other constituencies have a significant challenge ahead. Working together, I am confident that we can meet that challenge, but it will take a lot of creative thinking and doing on all of our parts. We in NOAA look forward to working with you, Mr. Chairman, and the other members of this Committee and Congress in achieving our national fishery goals.

This concludes my statement. If you have any questions, I will attempt to respond to them here or, if necessary, provide responses for the record.

The **Chairman**. Thank you, Mr. Gordon. Next, we will take Brock Adams, former Secretary of Transportation, former member of Congress, representing the Japan Fisheries Association. Good morning, Brock.

STATEMENT OF BROCK ADAMS, REPRESENTING THE JAPAN FISHERIES ASSOCIATION

Mr. **Adams**. Good morning, Mr. Chairman. It is a pleasure to be here this morning.

The **Chairman**. As with the other witnesses, we will put your entire statement in the record.

Mr. **Adams**. Thank you, Mr. Chairman. It was my understanding that that was to be done, and the time I know is limited. And therefore, I will not attempt to summarize it but will go directly to the points of greatest concern to my clients.

The **Chairman**. Thank you.

Mr. **Adams**. Mr. Chairman, my name is Brock Adams, I am a member of the law firm of Garvey, Schubert, Adams & Barer of Seattle, Wash., and I am here to represent the Japan Fisheries Association in connection with what was originally introduced as S. 1668. It is now staff working draft No. 2, and on the House side we have been retained to work on H.R. 5002.

I indicate that to describe the area of our particular interest, and that we do not represent the Japanese on all matters on all fisheries.

Mr. Chairman, our clients are basically people who fish in the 200-mile zone limit. More particularly, in the Pacific coast, though, they are also involved in some east coast operations also. In this area, we have represented them in the permitting process before the councils and have assisted them in contracts with U.S. fishermen.

We have been asked to represent them here before this hearing and on H.R. 5002, because these bills, when they were originally introduced, were more technical amendment bills. They have now a number of substantive changes, particularly on the House side and some that have been considered on the Senate side that are of great concern to our clients.

We, of course, support the streamlining and other items that are being considered on both sides for the councils, and these are considered to be internal U.S. matters, and we would not in any way attempt to interfere with those, other than the request that they be kept open for public comment. And particularly, scientific comment at all stages in the operation. So that various people including scientific people, as well as those involved in the industry, would have an opportunity to participate in the council deliberations.

The House has completed, as you know, Mr. Chairman, the markup on H.R. 5002 and I will speak to the particular issue that is of great concern in both bills and is a part of the staff working draft. Now, we know this is changing, so if any of my remarks seem to be out of date, it is because we are not exactly certain what the final word will be on the so-called reduction in allocation system.

I do want to express my appreciation to your staff and to the staff of the various members for their cooperation. This has not been a question that we have not had an opportunity to speak with them; it is just that we know that this matter has been one that has been under serious consideration and changes have been occurring constantly in the last 10 days.

Our concern is this: Section 3 of the Senate working draft proposes a reduction in the allocation system. The Senate proposal is that there be reductions during the course of the season. The House version is different, but it proposes to codify what is presently being done by the State Department in the year 1982 in terms of overall reductions.

What we are concerned about, Mr. Chairman, particularly is this language, and the language in section 3 of the working draft. It provides for the Secretary of State: "to make a reduction in allocation if the Secretary finds understandings or agreements with a foreign nation or its nationals which are considered to be significant factors in the determination of allocations are not adequately complied with or fulfilled by the foreign nation or its nationals."

We are concerned about this because it is quite vague in its application as to whether it applies to individual joint ventures, for example, individual actions, or an action in one part of total national operation as opposed to another.

I am prepared to answer questions of the committee in a moment and I will not try to detail the joint ventures that our clients have carried out, but I would say that these are very complicated. All of us that have fished in Alaska know the problems of what can you load, for example, from the rear of a trawler, whether or not they fit, whether gear of particular types fit, the purchase over the side, whether you can go far out to sea, or whether you are going to reconvert your craft fishery trawlers into bottom fish operations.

All of these are taking place and they are taking place in a very active private industry atmosphere, and I am here to represent to the committee this morning, Mr. Chairman—and I have checked this directly with Tokyo—that Japan is prepared to meet on long-term or immediate-term targets for joint ventures, and second, they support industry-to-industry meetings.

There have been a number of these conducted in the last year. Perhaps not as many as there should have been, but that we believe it is necessary that the industries themselves, under a prope- forum, discuss these general problems. It is in the private sector that we create these joint ventures. By we I mean the complexity of both a foreign fishery which is an individual company and a U.S. either fisherman or individual company making a contract for the coming year.

The final thing is that we request and hope that these will be commercially realistic goals. I would be happy to discuss with the members, because I know they are very familiar with them, for example, the Taiyo joint venture that took place in the Bering Sea with the Pollack Fishery, the Nippon Suisan joint venture, and the herring joint venture. These various specifics I believe we can and should try to work out between the two systems.

Now, the concern with the allocation is this, and I believe Senator Stevens mentioned earlier that there seems to be more planning on the Japanese side in the way they go about this fishery. This change in allocation, if it is made during the course of the year, destroys the availability of creating a stable market for U.S. fish. And incidentally, Japan is the largest purchaser of U.S. fish, and we have a positive trade balance with them in terms of export/import of fish. And Japan buys more fish than any other nation that receives a foreign fishing allocation; far and away more.

So there is a net positive flow taking place which I know this committee and the House committee wishes to expand. And it has been moving in this direction.

Now, what occurs is that this planning process for the coming year starts between 4 and 6 months before the season starts; say, January 1, 1982. If there is a reduction in allocation or an unknown amount as to what can be used or handled in that year, they necessarily have to cut back on their fleet or else take an enormous commercial gamble because they do not know what will be available for them to take themselves and what will be available in the joint venture. This involves such things as hiring of boats, establishing of mother ships, establishment of gear, arranging for marketing of product when it comes back and all of the items that are involved in an orderly system.

It has been very difficult this year, with changes in allocations that have been taking place, to maintain a stable system.

Now, it is in the interest of the United States as well as the Japan Fisheries Association that there be an orderly system that ships be in the appropriate places, that they be there in each current open season, and if this is not worked well—in other words, if somebody feels that any one of the foreign fisheries has not been carrying out its proper policy with regard to what the United States wishes done, if this could be done prior to the beginning of the season and it is stated to everyone, then the next season would go through and everyone would know that there was an active program of saying we cannot and should not be doing a particular thing.

This provides for an orderly system, and it also provides for a system where the U.S. fishery can plan on it. This planning process is jeopardized and we think that the easier way to provide the certainty is that it be done prior to the year beginning. Then the parties can negotiate amount, they can have negotiated their fish and chips position, and they can proceed with the orderly availability of ships for the purchase of not only American products but for their protein resource.

Yes, this program supplies about 10 percent of the Japanese total protein resource and it is a very important part of their entire lifestyle. There are about 14,000 people that are employed out in the area, and 300,000 in the marketing, processing and so on. The sort of thing that was indicated by the prior witness we hope to develop in this Nation in the next 10 years. And this type of technical support and cooperation between these industries we believe is the way to do it. And that has been suggested, and I wanted you to know we were in support of it.

There is not in the Senate bill, but I want to mention it because it concerns the scientific management of the resources, that is the problem of optimum yield. We hope that the present system will be maintained, which is to use a scientific method of optimum yield for the fisheries in the area and not manage just simply for the U.S. fishery. The reason for that is, again, those of us familiar with long-time fishing in the North Pacific, there are certain well-established U.S. fisheries that are the basis of our oldtime industry. There is a new industry coming into existence and if you do not manage the entire fishery on an optimum yield basis, you will have reduced the scientific availability of that protein resource and the opportunity to move into that resource.

So we hope that the provision will be left as it is with the flexibility for optimum yield being in the Commerce Department with its reflection into the State Department. I mention that because there is a change in H.R. 5002 regarding optimum yield, and we will hope that that matter can be settled.

Finally, there was placed—and I do not know whether it has been placed before the staff and the members of this committee—a so-called change in the "basket provision" in section 201(e)(H) which, as I know the committee is familiar, is the matters that can be taken into account when negotiating fishing matters. We are concerned because there was an attempt, or there is an attempt—and the language is not clear yet—to say that not just fishery matters will be considered, but all of the trade matters in negotiating these fishery allocations or fishery actions or nonactions.

This would bring in the Special Trade Representative, it could bring in the Department of Agriculture as well as the Departments of Commerce and State, and we would hope that if this does take place, it would be limited—the interaction to fish matters and not to other trade matters or even other food matters, for that matter, because it is difficult enough to operate on this problem without bringing in a number of new individuals. That has simply been suggested on the House side. It is not in the Senate bill.

We hope the present system which is flexible and allows the Secretary of State under the basket provision to consider anything that the Secretary believes is proper and we think that that should remain in that form.

I would like to conclude my statement, Mr. Chairman and members of the committee, by stating that the members of the Japanese Government and the members of the Japan Fisheries Association have been dealing directly with the State Department and the Department of Commerce on the allocation question. They are terribly concerned over the holdback because they believe that their joint ventures have been fairly done. Amounts have been fairly paid. They are prepared to expand their joint ventures next year.

As I say, I have not been directly involved in them, but I questioned the members that had attended those meetings and they had already offered to go up from the 14,000 metric tons which were two joint ventures last year that worked well. I might say that about 80 percent was all of the fish that were supplied under the 14,000 tons. In other words, the Japanese did not get all that was contracted for, but they are prepared to go up 400 percent.

This will bring in two more companies, so there will be four in the pollock fishery.

We are hopeful that this year in the herring matter that there will not be a dispute between the processors and the fishermen. The Japanese are prepared to go ahead with herring again, and we believe that that can also happen, and there are joint ventures in squid on the Atlantic coast.

So what this is, it is a step-by-step process to make gear compatible, make marketing compatible, to enable U.S. fishermen to do more high seas operation, and it is really a question of the industries now talking and the U.S. industry deciding the degree to which it wishes to move from its traditional fishery in crab and salmon, for example, over into the ground fish industry, and whether it wishes to convert or have new ships come in.

I appreciate very much your listening to our concerns, Mr. Chairman, and I am hopeful that there will be a solution to this that will move forward the process that has been outlined this morning.

The CHAIRMAN. Brock, on the joint ventures, the Japanese—and it seems to me this is true with almost all of the problems we have; they move as little as possible and only when they have to. You have heard this complaint over and over from American manufacturers trying to get into the Japanese market, and it is only when there is the threat of congressional action or State Department action that appears to be imminent, that there is a slight budge.

And I have that same sense on the joint ventures. I appreciate the statement that you have from the Japanese Government that you gave us, but we have been asking for months and months for cooperation indicative of the statement, and we have not seen it yet.

But let me switch on that. Would the Japan Fisheries Association support 100 percent observer coverage?

Mr. ADAMS. One hundred percent of what?

The CHAIRMAN. Observer coverage of foreign ships.

Mr. ADAMS. They believe that that is excessive, Mr. Chairman, because 20 to 30 percent has been indicated as all that is necessary scientifically, and these observers tend to be rather young and they are not needed on every ship.

Also, they are trying to fit the price. There was a $16,000 price per observer indicated per month for vessels in the Atlantic. And they were trying to determine what the cost of that overall would be, and it certainly was not the salary of the observer, so they are trying to determine the amount.

They would like to not have 100 percent. It is very difficult on small vessels, and out in high seas operation with young people, to get them on and off. They want the proper coverage but not 100 percent.

The CHAIRMAN. Slade?

Senator GORTON. As you know, Mr. Adams, the Senate bill does not contain the House provision on optimum yield, but that does not indicate that we do not regard allocations—the allocations provision as the key to the bill. I understand your suggestion that allocations set once a year—should be set once a year for the purposes of predictability, but I think it is important to find out a couple of matters directly to your clients.

The first is, of course, allocations will be forthcoming unless significant understandings on which they are based are broken. It is not a question of mere whim that results in holding back allocations at all. Second, that the American industry needs predictability as well. It relies on these understandings and agreements as much as your clients rely on the allocations, and is the welfare, obviously, of the domestic industry with which we are most concerned.

And that leads me to something which came up with myself and Senator Stevens with the previous witness. You, in your written testimony at least, discussed the uncertainty about ultimate allocations and refer obliquely to the fact that the actual allocation this year was 10 percent less than the Japanese expected.

But it seems to me precisely from what we have heard from Mr. Gordon that the reason for that 10-percent cut was not just arbitrary or a matter of whim, but a persistent, continuing failure to show good faith intentions to comply with our basic fish-and-chips policy. If you wish to comment on that, I would be happy to listen to the comment.

Mr. **Adams**. Yes, Senator, I would. Last year—and this—what I want to stress is this is a commercial matter between individual companies. In other words, governments do not make these joint ventures.

And last year, in pollock, for example, this is how this works. Not, you know, how we wish it might but what physically happens. Taiyo and Nippon Suisan each went into the Bering Sea with 7,000 tons each of joint venture contracts. I do not believe there has been any accusation that these were not carried out; that everybody was fairly paid, and they went forward head and shoulders above what other joint ventures did where there was a lot of trouble.

They received about 82 percent of what they contracted for. I think there were reasons for that. The same thing occurred with the joint venture on squid in the Atlantic where the Japanese contracted for 1,000 tons and they got 323. And they are not complaining about the fact that this has happened, but it demonstrates that these things do not just occur. That is just a shortfall that they did not get.

But this year, they said that despite that, and despite the fact there were technical gear problems and they were servicing these U.S. vessels as they came in and they had to change Japanese methods of pick up from the stern of the trawlers. Taiyo has increased to go up to a 20,000 tons joint venture, as will Nippon Suisan. Kyokuyo will come in for 10,000. Hoko Suisan will come in for 10,000. This is all in pollock. So in other words, they are going up to 60,000 tons.

Now, that does not sound like much in an overall sense of total fisheries, but in terms of technically carrying this out with the U.S. fishing industry and processing it and marketing it, the Japanese had a loss last year commercially. They expect a loss this year on it. But they will do it and they are attempting to go above that figure up to the 60,000 tons.

And I would like to talk about a plan for the next 3 to 5 years of going to 200,000 metric tons as these boats are available and as the gear is compatible. So I cannot tell you, because I was not in on what has gone on between the committee and the State Department and Commerce and the Japanese negotiators in 1980 and in 1981 that might have led to this year's 10 percent reduction. But I do not know of anything in the joint venture operation that was bad.

Senator GORTON. We understand that. It is not really a question of—particularly of particular joint ventures and how they were carried out. The policy is set by the administration, of course, and the considerations we have to take into account in writing a law are the overall relationships between the nations, and in this case, it reflects a persistent lack of participation on the part of the Japanese as a whole and joint ventures in spite of really significant prodding by the United States and the fact that lots of boats are available for them now, I am sure in Alaska, and I certainly know in the State of Washington.

Thank you.

The CHAIRMAN. Senator Stevens?

Senator STEVENS. The problem about the joint ventures I think is best demonstrated by some figures. The Russians have no allocation and they have agreed to 65,000 tons in joint ventures. The Koreans have 250,000 tons allocation and they have agreed to 40,000 to 60,000 tons in joint ventures this year. The Japanese take 1.4 million tons and they are agreeing to 40,000 to 60,000 tons in joint ventures. Their tonnage is less than the Russians, for whom we have denied any allocation and they used to take pollock, too.

The Japanese keep telling us they need more time. They have been telling us that for 14 years, Brock, and they are still at the point of having less than, what, 150,000 tons U.S. effort as compared to their 1.4-million, 1.5-million effort. I just wonder: What is it going to take to get their attention as far as U.S. policy is concerned?

I do not envy you representing your client in dealing with the attitudes that exist, that I know exist in the American industry and the American Government. I do not know, maybe you can tell us, what do we have to do to give them the message? They still catch more halibut unintentionally than we allow our halibut fishermen to catch intentionally. Did you know that?

Mr. ADAMS. Oh, yes, I am well aware of the problem.

Senator STEVENS. We now have to have an amendment to the halibut situation so we can have a limited-entry program for the U.S. fishing fleet in Alaska for halibut because they continue to catch halibut, and the Japanese fishing fleet continues to catch halibut while they are fishing for pollock. Now, what are we going to do about that?

Mr. ADAMS. Well, Senator, I think you have already done it in that the process started. They have certainly gotten the message with what has occurred in the last year and in the last two acts. What I am really indicating to you is I think we should see—and I think we should put these industries together to determine whether or not the process that is in place is working before we change it again.

In other words, there is movement now. The joint ventures are there. The U.S. fleet does have to convert itself. We are aware of that. We also have to get experienced fishermen, and I agree with you also. I hope the new generation of fishermen will be able to fish farther offshore. Right now, these joint ventures are, to a great degree, limited, as you know, to coastal waters, particularly inside Kodiak Island or in the Bering Sea, because our gear of the newer people in is not equipped to do a high-seas operation and load onto mother ships, as are the existing Japanese fleet.

Now, with regard to the other nations, the Japanese buy more than any other nation of our exports, so we do have a positive-balance trade. Second, there is an established Japanese fishing industry which can be very helpful in working with ours. The other industries in the countries that you mentioned are trying to get into the trade. They are in the position of buying their way in. The Japanese now have a message that they must do that, too.

But what I am asking the committee to do is to be looking at this and seeing if your policies are not already successful. And if the meetings and the commercial meetings do not take place the way you like them, well, those contracts the Government cannot make between the groups.

Senator STEVENS. I do not think the Japanese have gotten the message. We now have waiting, asking for allocations, Norway, Germany, Sweden, Spain, and Poland. Those fleets are there waiting for allocations of fish in the North Pacific Fisheries Zone. The Japanese still have the allocations.

If I had my way, I would divide up the Japanese allocation and give a portion of it to each one of those fleets, because in the long run it will be easier to move those individual fleets out when they each have a percentage than it is to try and budget the Japanese in their total relationships with the United States. I think the fisheries that are protected, they get 7 percent loans in Japan. Do you know what it costs for a Seattle or Alaskan fisherman to float a boat up there now? I will tell you it is 2 points over prime, and it is awful hard to catch fish fast enough to pay 2 points over prime.

And they have lifetime health insurance for the fisherman. They have market and price supports for their fish when it comes in. There is no uncertainty in the fishing industry in Japan, and there is fantastic uncertainty in ours. And we now even are losing our guaranteed loans for new vessels as far as the domestic fishing fleet is concerned.

Now, I do not believe that the Japanese can in any way complain about U.S. policy set. They have not seen anything yet, Brock. As far as I am concerned, that is the message you ought to take them. If I can devise anyway at all to get those vacuum cleaners out of Alaskan waters, I am going to do it.

Mr. ADAMS. I understand the message, Senator.

Senator STEVENS. I am awake now.

The CHAIRMAN. I have no further questions. Slade?

Senator GORTON. No, I am not going to try and follow that.

The CHAIRMAN. Ted, anymore?

Senator STEVENS. No, thank you.

The CHAIRMAN. I think Brock did get the message.

Mr. ADAMS. I got the message, Mr Chairman.

The CHAIRMAN. Mr. Secretary, thank you for coming, we appreciate it.

Mr. **Adams.** Thank you very much. I appreciate the committee taking time to hear our message.

[The statement follows:]

Statement of Brock Adams on Behalf of the Japan Fisheries Association

Mr. Chairman and members of the committee. I am Brock Adams, attorney with the law firm of Garvey, Schubert, Adams & Barer, Seattle, Washington, and representing the Japan Fisheries Association (JFA).

JFA is an association of Japanese fishermen, many of whom fish within the U.S. 200-mile Fishery Conservation Zone (FCZ) under permits issued pursuant to the Magnuson Fishery Conservation and Management Act (MFCMA). Fishing activities of JFA's members in the U.S. FCZ supply the people of Japan with a significant portion of their protein requirements.

We and our client have reviewed Senate Staff Working Draft No. 2, dated April 19, 1982, and compared it with earlier drafts of S. 1668 intended to amend the MFCMA. We believe that in many respects the latest draft constitutes a substantial improvement over earlier versions. However, it still contains several provisions which cause us grave concern. I would like to highlight these concerns in these remarks.

I. SECTION 3 (REDUCTION OF ALLOCATION)

Section 3 would add a new paragraph to section 201(e) of the Act (16 U.S.C. 1821(e)), which sets the existing procedures and criteria for allocation of TALFF. The new paragraph as most recently modified would compel the Secretary of State to make in-season reductions in a foreign nation's allocation "in the manner and quantity" he finds appropriate if he and the Secretary of Commerce find that:

"Understandings or agreements with a foreign nation or its nationals, which are considered to be significant factors in the determination of allocations among foreign nations, are not adequately complied with or fulfilled by the foreign nation or its nationals."

The rest of that paragraph then describes the manner in which the withheld allocation might later be restored.

A. Severity of economic dislocation and adverse impact caused by mid-season changes in allocations to Japan

We do not believe that the drafters of Section 3 have had sufficient information available to them to focus upon the severity of the economic dislocation and the adverse impact upon Japan's fishing efforts which are caused by mid-season changes in the allocations available to Japan.

1. *The relationship between the allocation process and the Japanese fishing industry's annual fishing plans.*—Under current law, FCZ fish resources which are surplus to U.S. harvesting capacity are allocated to foreign nations annually in accordance with the criteria specified in Section 201(e) of the MFCMA (16 U.S.C. 1821(e)). The amount available for foreign allocation is denoted Total Allowable Level of Foreign Fishing (TALFF). Prior to 1982, the TALFF for each year was almost entirely allocated to foreign nations prior to the beginning of that year. The great bulk of the TALFF was allocated to each foreign nation prior to the beginning of the fishing year. Under the practice of the United States Government prior to 1982, the U.S. allocation of TALFF among foreign nations represented a commitment to each foreign nation that its allocation from TALFF would not be reduced during that year. Based upon this commitment, the various foreign countries fishing within the FCZ could make firm internal allocations upon which individual fishing companies could plan their own fishing operations for the year, both in the United States FCZ and elsewhere.

In Japan, approximately three to four months before the start of the fishing year, each individual fishing company begins preparation of its overall fishing plans for that year based upon assumptions about the expected allocation of TALFF to Japan for that year. These plans include preliminary decisions concerning the operation of over four hundred individual vessels within the FCZ. Based upon these assumptions and the preliminary designation of vessels to be committed to the fishery within the FCZ, each company then sets up a schedule for each vessel. After the above plans have been developed, each company must then begin taking steps to implement them. These include negotiation and execution of contracts (such as those for the charter of vessels and the hiring of crews, for the purchase and sale of fish and related products, for cold storage facilities, for fishing supplies, for fuel, etc.) negotiation of the date of commencement of operations for vessels and their crews, and the like. In addition, this is the time when necessary vessel repairs must take place.

The second stage of planning for the Japanese fishing industry commences once the United States Government's actual allocation plans for the next year become known. When these allocations are confirmed, then the individual Japanese fishing companies can adjust their preliminary plans to take into consideration the actual allocation. For the years prior to 1982, very little adjustment has been necessary, as there has been little discrepancy between the predicted and actual allocations to Japan. This predictability, resulting from consistent and orderly management of the allocation process, has made it necessary for the Japanese fishing industry only to refine its preliminary plans without major disruption. This has allowed it to proceed on schedule so that it could maintain commercially feasible fisheries as a whole on as efficient a basis as possible.

2. *1982 allocation practice and its impact.*—For the 1982 fishing season, the United States has changed its allocation system to a three-step system (with separate allocations made January 1, April 1, and July 1) and withheld substantial portions of TALFF which under the prior practice would have been allocated at the beginning of 1982. This system of in-season-allocations has caused and will continue to cause serious problems for Japan and other foreign countries attempting to plan their fishing activities both in the United States FCZ and elsewhere. Even if Japan were to comply with all the U.S. policy objectives which motivate the decision to delay allocations from TALFF, Japanese fishing companies would be seriously impaired in their ability to operate, and their costs of operations would soar drastically. Serious harm results from the uncertainty of mid-year allocations, totally without regard to whether Japan accepts the position urged by the United States.

3. *Section 3 of Senate Staff Working Draft No. 2 and similar provisions will perpetuate and exacerbate the the types of operational problems which result from the 1982 allocation practice.*—Section 3 of Senate Staff Working Draft No. 2 and the system of in-season allocations being employed in 1982 create substantial uncertainty both as to the ultimate allocations to each foreign nation and as to their timing. (As a matter of fact, allocations for 1982 which were to have been made on April 1 were only announced as late as April 26 and the actual allocation which was made available accounted for only 15 percent as compared to the 25 percent expected.) Over four hundred vessels are employed in the Japanese fishing, transport and supply fleets in the U.S. FCZ. These vessels employ over 14,000 crew members. Another 300,000 people are directly employed in related fish processing and marketing activities in Japan. Many more thousands of people are dependents of these employees or economically dependent (e.g., as suppliers) upon their activities. Such delay in the release of the allocation and the unexpected substantial reduction which occurred this year places an enormous planning, operational and economic burden upon foreign fishermen and discourages their willingness to cooperate with the U.S. fishing industry.

B. Section 3 should not be adopted

We oppose Section 3 and urge that it not be adopted. First, it is overly vague and broad in its description of the type of "understandings or agreements" to which it would apply. It apparently would not limit the scope to regularly negotiated treaties or to similarly formally negotiated bilateral or multilateral agreements among nations. Instead, it could encompass even the unilateral "understanding" of the United States concerning the nature and extent of action which a foreign nation or its nationals will take on a virtually unlimited range of matters.

Second, this proposal will work in a very unfair manner against foreign nationals and foreign governments. Any failure by any foreign national to adequately fulfill any understandings or agreements, into which he or it entered without any involvement of or knowledge by other nationals and the government of the same country, could well result in drastic reductions of the catch allocations to that foreign nation as a whole. This is tantamount to penalizing those who cannot be held responsible at all for the default made by others.

We understand that recent changes in the language of Section 3 may be intended to modify somewhat the extreme harshness of that paragraph so that the Secretary of State could apply sanctions to that section only if (1) there is a pattern of "violations" by foreign nationals of understandings or agreements, and (2) those understandings and agreements were themselves significant factors in the original allocations to that foreign nation. If the committee so intended, then we believe that the committee's intention should be clearly stated in the history of the bill. Otherwise, there will be strong pressure to require the Secretaries of State and Commerce to act as policemen of each and every private agreement between foreign nationals and U.S. domestic fishermen operating within the FCZ. Such a policy would be cumbersome and costly and, in the long run, self-defeating, and would unnecessarily intrude the Federal Government into the day-to-day monitoring of the specifics of highly dynamic private business arrangements.

Third, there are no criteria against which to determine whether the particular foreign nation or its nationals have "adequately complied with or fulfilled" these vague understandings. Furthermore, as a practical matter and as a matter of principle, the question of the foreign nation's implementation of any agreement or understanding between the United States and that country should be resolved through the usual and ordinary diplomatic consultations between the two governments and between the parties, and not by establishing a system for the unilateral application of sanctions against that country. In addition, the proposal fails to give the Secretary of State adequate discretion. If the Secretaries of State and Commerce determine based upon the vague criteria of this proposal that the foreign nation or its nationals have "not adequately complied with or fulfilled" some understanding, then the Secretary of State is required to withhold a portion of that country's allocation, even if there are other compelling reasons for not applying this sanction.

Fourth, this change is not necessary. It is not necessary because the current law already gives the United States government all the flexibility it needs to effectuate the policies which underlie the proposed change. Section 201(e)(1)(H) (16 U.S.C. § 1821(e)(1)(H)) currently authorizes the Secretary of State, in cooperation with the Secretary of Commerce, to take into account any matters he "deems appropriate" in making allocations to foreign nations.

Fifth, this proposed change is not desirable. It further complicates an already overly cumbersome allocation process. Engrafting yet another procedure on top of the existing process further exacerbates the problems that now exist in trying to administrate the allocation process in a manner which will provide necessary orderliness and predictability to the fishing efforts of the various foreign countries operating within the FCZ. Furthermore, the allocation of surplus fish to a foreign nation is a commitment to that nation.

II. SECTION 22 (FOREIGN FISHING OBSERVERS)

A. Authority of observer to carry out scientific programs unrelated to the MFCA

Section 22(a) would amend Section 201(i)(3) (16 U.S.C. 1821(i)(3)) to authorize the Secretary of Commerce to require U.S. observers to perform duties in relation to scientific programs unrelated to the purposes of the MFCMA. Japan has accepted U.S. fishery management jurisdiction over the international waters of the FCZ and has accepted the placement of U.S. government observers aboard Japanese fishing vessels only for the limited purpose of implementing that limited jurisdiction. The assignment to such observers of duties unrelated to the purposes of the MFCMA would amount to a claim of U.S. jurisdiction over the 200-mile zone which Japan does not currently accept. The implications of such an extension of U.S. jurisdiction over international waters are of serious concern. The Congress should consider carefully the implications which this proposed extension of authority would have for other coastal states which may seek to interfere with the transit, navigation, and other rights of the international maritime community.

B. Foreign fishing observer funds

Sections 22(b) and (c) adopt a provision found in H.R. 5002 which would eliminate the requirement of the current laws that payments for the U.S observer program be authorized in advance by specific appropriation acts. We oppose this change. Although the cost of the observer program is paid by the foreign vessels which operate in the FCZ, the amount of that cost should be subject to Congressional control. As observer coverage increases, the cost of the program could become enormous. Unless Congress retains control of those costs through the appropriation process, the Department of Commerce will have little incentive to minimize those costs—the program will be essentially unaccountable.

The usual and ordinary method by which the United States government controls its expenditures and allocates its manpower and resources is through the annual appropriations and budgeting process. The appropriation process provides the legislative branch (Congress) with the means under a system of checks and balances by which it can fulfill its Constitutional role as overseer of the actions of the administrative branch. This Congressional power should not lightly be abdicated. There is no good practical policy reason for excepting the expenditures for the observer fund from the discipline and scrutiny of Congressional oversight through the appropriation process.

In addition, we believe that Congress should monitor closely the increasing costs of the observer program as the Congressional goal of 100 percent observer coverage is approached. We are confident that Congress will revise that goal as the enormity of those costs becomes apparent (especially since the scientists and statisticians who run the program of NMFS have concluded that approximately 20 to 30 percent coverage is adequate to ensure the reliability of the extrapolations made from observer sampling data). The observer program should continue to be subject to the appropriation process so that Congress may review the cost of the increased levels of coverage it has mandated and control the cost.

III. SECTION 16(b) (EMERGENCY ACTIONS)

A. Authority of Secretary and regional councils

Under existing law (MFCMA § 305(e) [U.S.C. § 1855(e)]), the authority to determine if an emergency exists and to promulgate emergency regulations lies with the Secretary of Commerce. Section 16(d) of S. —— proposes that either the Secretary of Commerce or a regional council can initiate the process which leads to promulgation of emergency regulations. It also eliminates the differing procedures depending upon whether there is or is not an existing FMP in the fishery concerned. However, Section 16(d) also would require that the Secretary of Commerce promulgate emergency regulations as proposed by a regional council if approved by that council by a unanimous vote. While it may be desirable to increase the regional councils' role in initiating the process leading to promulgation of emergency regulations, the Secretary should not be reduced to acting as a rubber stamp for whatever emergency action may be proposed by a regional council, no matter how arbitrary or capricious. The Secretary of Commerce must have the ability to use his own expertise to evaluate both the alleged emergency and the proposed response to it and to modify the response as necessary. The proposed bill would strip him of his ability and leave the possibility of immediate implementation of arbitrary and capricious emergency regulations totally unchecked. Removal of the authority of the Secretary of Commerce to exercise his discretion in emergencies could have an immediate and disastrous impact upon substantial elements of both the foreign and domestic fishing industries.

B. Expansion of scope

As was true of Section 6(3) of S. 1668, Section 16(d) would expand the authority of the U.S. fisheries managers to authorize emergency action in non-conservation emergencies. Under the statute as presently written (305(e) (16 U.S.C. § 1855(e))), the Secretary of Commerce is authorized to take emergency action only in the case of an emergency "involving any fishery resources." Section 16(3) would authorize such action in an emergency "involving any fishery." The proposed change would vastly expand the potential subjects of emergency action. If this change were adopted, the management process would be subjected to greatly increased pressure to respond to political issues through emergency action. The normal procedures for preparation and implementation of fishery management plans and amendments could largely be replaced by "emergency" actions responsive to immediate political pressures. We do not believe that U.S. fisheries management would be served by opening the Secretary of Commerce or the regional councils to this kind of intense, single issue political pressure from local constituent groups. Emergency action should be limited to conservation issues.

C. Duration.

The MFCMA currently limits the effectiveness of an emergency regulation to 45 days following initial publication in the Federal Register (305(e) (16 U.S.C. § 1855(e))). Such a regulation may be re-promulgated for one addtional 45-day period. These restrictions insure that emergency action will be used only as an interim measure and that normal procedures will be promptly invoked.

Section 16(d) of the new bill would place a 180-day maximum limitation on emergency regulations in all circumstances. Extension of the maximum validity of emergency regulations from 90 to 180 days provides little incentive to invoke normal procedures promptly. Since emergency action circumvents the normal procedures for approval and implementation of plans and amendments, the effectiveness of emergency regulations should be severely limited. The present provision of the MFCMA strikes an appropriate balance between permitting effective emergency action and defending the normal procedures—including related opportunities for public input, scientific evaluation, thorough consideration and careful decisionmaking.

IV. SECTION 11 (PUBLIC PARTICIPATION)

We recognize the motivation of the Committee to substitute specific procedures for regional councils and their subordinate bodies to replace the cumbersome notice publication requirements of the Federal Advisory Committee Act (FACA). For the most part, the substitute procedures proposed in Section 11 of the bill provide adequate safeguards to the public. However, there is still one problem not fully and adequately addressed by the bill.

A concern shared by both domestic and foreign fishermen is that the "open meetings" requirements of FACA be preserved. The problems with FACA described by the regional councils in the House oversight hearings related solely to the cumbersome Federal Register notice publication requirements. Both domestic and foreign fishermen are anxious to preserve their rights under current law to attend those meetings of the councils and their advisory groups, where basic management decisions are made. The Committee should make clear its intention that these meetings remain open to the public.

V. SECTIONS 13, 15, AND 16: PROVISIONS TO EXPEDITE COMMERCE DEPARTMENT ACTION

We are supportive of the effort to streamline procedures for the approval and implementation of fishery management plans. However, we were concerned that the provisions of S. 1668 which were intended to expedite approval and implementation of fishery management plans could so restrict and limit the participation of the Secretary of Commerce as to jeopardize the ability of the Secretary to insure compliance of plans and implementing regulations with the MFCMA. While S. —— has substantially revised the proposed procedures set out in S. 1668, there are a number of problems which are raised by the new bill.

Section 13 of S. —— would amend Section 303(c) (16 U.S.C. 1853(c)) to make it mandatory for regional councils to include proposed regulations in any FMP or amendment. Furthermore, that section would eliminate the distinction between a plan or amendment and the regulations implementing it, making the regulations a part of the plan or amendment. However, under the procedures set out in Section 15 of S. ——, these changes will make it extremely difficult for the public to review and to make timely and adequate comment upon these regulations.

Section 15 of S. —— would give the Secretary 60 days after receipt of a proposed FMP or amendment within which to review the plan or amendment (including the accompanying proposed regulations), to publish the proposed regulations and a notice of availability of the plan or amendment in the Federal Register and allow a public comment period of not less than 30 days on the proposed plan or amendment, to consider the data, views and comments from interested persons submitting comments in response to the publication and to notify the council if he disapproves or partially disapproves of the plan or amendment. If the Secretary fails to accomplish all of the above within this 60-day period, then the plan or amendment will be deemed to be approved as submitted. It will be an impossible task for the Secretary of Commerce to accomplish all of the above within 60 days if public comments are to be considered. Even under the best of circumstances, the deadline for comments to be received will fall within the last four weeks before the Secretary must approve or disapprove or partially disapprove of the plan or amendment. If there is any delay, whatsoever, in publishing the notice in the Federal Register, this four-week period for consideration of public comment and notification to the council could be cut in half or even totally eliminated. This problem will be especially acute for interested parties distant from Washington, D.C. who experience several days' delay in receiving the Federal Register, and then after its receipt will need to request a copy of the plan or amendment. This delay will cause intolerable hardship, since Section 16(a) would also reduce the comment period from the present "not less than 45 days" for regulations now found in 16 U.S.C. 1855(a) to "not less than 30 days." Furthermore, this comment period does not come at an opportune time. The sole opportunity for public comment would occur only prior to the Secretary's initial determination of action to be taken on the FMP or amendment. There is no provision for any public comment on any revised plan or amendment returned to the Secretary from the council after the Secretary has disapproved or partially disapproved of it. Serious problems with a plan or amendment as revised by the council and resubmitted to the Secretary of Commerce would thus be insulated from public comment and the opportunity to correct these problems based upon those comments.

Section 15 of S. —— will treat the Secretary's review of the revised plan or amendment resubmitted by a council like an original review, except for a shortened period of 45 days in which to accomplish this purpose. A fixed time limit for review would seem to be an improvement over the possibility which existed in S. 1668 that review of the revised plan might need to be accomplished within an absurdly short time frame. However, there are several problems which would result from the restricted time limit. In addition to the concern over "deemed approval" of defective plans, we are also concerned that this procedure effectively prevents any public input into the review of the revised plans and amendments.

Consistent interpretation and implementation of the MFCMA require that the Secretary of Commerce be given adequate power, resources and flexibility to perform these functions. Furthermore, there is a need for effective public comment before promulgation of plans and amendments which does not exist in the proposed amendments. Fisheries management under the MFCMA involves national domestic and foreign policy. It would be detrimental to all fishing interests within the FCZ if Congress were to so limit and restrict the Commerce Department that it was unable to properly perform its assigned functions. It would be even more detrimental to all fishing interests if the procedures eliminate or substantially reduce effective public comment at the national level prior to implementation of the plan or amendment, or any revised plan or amendment.

Thank you very much for the opportunity to present these views to you.

The CHAIRMAN. We will move on next to the council panel, Mr. Patrick Carroll, Mr. Kami, Mr. Branson, Mr. Putnam, Mr. Vega, Mr. Hart, Mr. Lee, and Mr. McDevitt. And obviously, you are going to have to spread yourselves quite widely across the table.

Gentlemen, as I indicated with all of the other witnesses, your statements in their entirety will be in the record, and we have asked you to limit your statements to 3 minutes apiece. And when you talk I think you had better take the microphone and pull it over to you, because the people in back will not be able to hear you.

So as you go down, and we will take you in the order I called you, pull the microphone over so that the people in back can hear.

And we will start with Mr. Putnam. We will go right across the table. You will know when your turn is coming.

STATEMENTS OF B. J. PUTNAM, CHAIRMAN, GULF OF MEXICO FISHERY MANAGEMENT COUNCIL; PATRICK CARROLL, VICE CHAIRMAN, NEW ENGLAND FISHERY MANAGEMENT COUNCIL, ACCOMPANIED BY DOUG MARSHALL, EXECUTIVE DIRECTOR; HARRY T. KAMI, VICE CHAIRMAN, WESTERN PACIFIC FISHERY MANAGEMENT COUNCIL; JIM H. BRANSON, EXECUTIVE DIRECTOR, NORTH PACIFIC FISHERY MANAGEMENT COUNCIL; HECTOR VEGA, CHAIRMAN, CARIBBEAN FISHERY MANAGEMENT COUNCIL; JOHN C. BRYSON, EXECUTIVE DIRECTOR, MID-ATLANTIC FISHERY MANAGEMENT COUNCIL; HERMAN McDEVITT, CHAIRMAN, PACIFIC FISHERY MANAGEMENT COUNCIL; O. B. LEE, JR., CHAIRMAN, SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

Mr. PUTNAM. Thank you, Senator.

It is a pleasure for me to be here today to represent the Gulf of Mexico Fishery Management Council to comment on your amendments to the FCMA. I believe our council would fully support the language in your amendment to section 201 providing for reduction in allocation to foreign fishermen. Our council is also on record supporting H.R. 5002, amendment to section 201(e), which extends the TALFF reduction provisions of paragraph (2) to nations violating other agreements such as ICCAT, which may not be a factor considered by the Department of State in making allocations in your amendment.

Under section 204(b), our council supports the proposed amendments to paragraph (3)(b), (4) and (5) which insert "hold capacity."

Under section 201, our council supports the new proposed subsection (j), which provides for foreign recreational fishing. Senator, I believe our council would prefer to have the wording in that amendment that says "vessels operated not for profit carrying U.S. nationals." Quite often they bring their own people into the country, say Mexicans, they bring their own nationals in and fish with those nationals and they are paid.

So as long as they are not carrying U.S. nationals we would not have any opposition to that.

Under section 301(b), we support the concept of your amendment to the subsection on guidelines. The council did, however, suggest the concluding sentence combine language of H.R. 5002 and S. 1668 to read as follows: "The guidelines shall not have the force and effect of law and shall not require mandatory compliance by the councils."

Our intention here was to both insure that FMP's are not disapproved by virtue of failure to live up to the exact letter of the provisions of the guidelines and to discourage judicial entities from using the guidelines as interpretation of law in judging FMP's.

We were disappointed that the staff working draft under number two did not address revisions of national standard one in section 301(a). We, like all other councils, suggested amending the standard and were at least consistent in suggesting replacing the word "achieving" with "allowing." We are aware that the National Marine fisheries service provided the comment that no change is needed.

But we felt that because a sufficient number of legal, narrow interpretations that FMP's or current levels of domestic effort would not achieve OY that a change is warranted. Our council supports the proposed amendment to section 302(b), paragraph (5), providing for removal of council members. I feel certain they would support your proposed revision of section 302(b), new paragraph (2), which sets forth the qualifications for members and procedures for purging the governors list for unqualified individuals. We also support the provision for appointment of council members 45 days in advance.

I am trying to just recap as quickly as I can.

Our council supported a provision similar to your amendment of section 303(c) and I am sure would not object to the slight change in your language. Conceptually, our council has endorsed the approach set forth in your bill for a data collection system for fisheries not managed under FMP's

Under your proposed revision of sections 304 (a) and (b) again, I would like to withhold judgment here because our council has not reviewed this. Basically our Council concurs with the concepts set forth in your revision to the section on the emergency action. We however felt that a two-thirds majority vote by the council should be adequate for emergency action, rather than a unanimous vote, which would be impossible for us because one council member has not been in attendance for over 2 years.

I would like to mention that we did support several other amendments suggested by H.R. 5002 and S. 1668, as indicated in the attached letter. I will mention for your consideration only one of these. In H.R. 5002, section 5—305(d), which would allow the Secretary to enter into a cooperative agreement with the States to administer a permitting system. We favor this strongly, because the States already register boats and we see no need for another duplicate system.

Thank you very much for the opportunity to comment on behalf of our council. If we have additional comments they will be submitted later.

[The statement follows.]

STATEMENT OF B. J. PUTNAM, CHAIRMAN, GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

Mr. Chairman, members of the committee, it is indeed a pleasure for me to appear before you today to testify on proposed amendments to the Magnuson Act. I would like to begin by qualifying my testimony. Our council has not had the opportunity to review your draft bill in its particulars but has addressed many of the concepts that you have put into amendment language. Therefore, I have based my testimony on our past discussions and positions on these issues and that which I believe would be the position of our council. Should the council disagree with any of the points in the testimony I have presented, we will provide additional comment at a latter time. Further, let me say, we are quite pleased that your committee is addressing revisions of the act and I hope our comments are helpful to you in your task.

Your first proposed change is to section 201(e) by adding new paragraph three, subparagraphs A and B, which provide for reduction of foreign allocations of nations not complying with rules promulgated under the act. I believe our council would fully support the language of this amendment. Our council also is on record supporting the H.R. 5002 amendment of section 201(e) which extends the TALIFF reduction provisions of paragraph (2) to nations violating othe agreements such as ICCAT, which may not be a factor considered by the Department of State in making allocations in your amendment.

Under section 204(b), our council supports the proposed amendments to paragraphs (93)(B), (4) and (5) which insert "hold capacity" and modify the act's provisions in regard to actions on foreign permit applications.

Under section 201, our council supports the new proposed subsection (j) which provides for foreign recreational fishing. I feel our council would be particularly pleased with your revision which limits such foreign vessels to those "not operated for profit." We did, however, suggest a change which would require the Secretary to consult with the "affected council" as well as State Department and Coast Guard. We made this recommendation, not because of any grandiose idea of our importance, but because we firmly believe we will be more knowledgeable of conditions and necessary restrictions in the fishery throughout the region and those conditions pertaining to other fisheries in which they may take incidental bycatches.

Under section 301(b), we support the concept of your amendment to the subsection on guidelines. The council did, however, suggest the concluding sentence combine language of H.R. 5002 and S. 1668 to read as follows: "The guidelines shall not have the force and effect of law and shall not require mandatory compliance by the councils." Our intent here was to both insure that FMPS are not disapproved by virtue of failure to live up to the exact letter of the provisions of the guidelines and to discourage judicial entities from using the guidelines as interpretation of law in judging FMPS. We certainly intend to utilize the guidelines in developing our FMPS but are doubtful that we can fully comply with all the provisions.

I must admit that I am disappointed that your staff working draft number two did not address revision of national standard one in section 301(a). We, like all the other councils, suggested amending the standard and were at least consistent in suggesting replacing the word "achieving" with "allowing." We are aware NMFS provided comment that no change was needed. We, however, feel there has been a sufficient number of narrow legal interpretations that FMPS or current levels of domestic effort would not achieve OY, that a change is warranted. As a result of other provisions of the act, we are usually forced to deal in hard numbers for MSY, OY, Etc. Whereas the fishery populations fluctuate in size due to biological characteristics and environmental conditions. However, we keep running into comment suggesting that a poundage exactly equivalent to OY must be harvested annually or else we are not achieving OY. Our council has suggested revised language for this amendment in our letter of March 22, 1982, to Senator Packwood. I ask that this letter with its attachments be made part of the record. Our council has no comment on the inclusion of the Mariana Islands in the Western Pacific council.

Our council supports your proposed amendment to section 302(b), paragraph (5) providing for removal of council members. I feel certain they would support your proposed revision of section 302(b), new paragraph (2) which sets forth the qualifications for members and procedures for purging the governors list of unqualified individuals. We also support the provisions for appointment of members 45 days in advance.

Under section 302(h)(1), I feel our council would have no objection to this amendment which clarifies that plans are prepared for fisheries which need management, instead of all fisheries. We have been operating in this mode anyway.

Under your new proposed subsection 302(i), I prefer to withold judgment until our council has debated this provision. It does incorporate the concept we supported, that the decision on which fisheries will be managed will be made at the regional level by the councils. However, it appears to leave the final decision to the Secretary with no provision for arbitrating differences in opinion. Therefore, I withhold comment on the provision.

Our council supports your new proposed subsections 302(j) and 302(k) pertaining to discretionary functions and exemption from FACA.

Our council has taken a position in opposition to the proposed amendment language for 303(b)(6). Our council does favor the concept of allowing the collection of higher fees for limited access systems such as set forth in S. 1668, but questioned the advisability of programs such as the vessel buy-back program as set forth in your amendment.

Our council supported a provision similar to your amendment of section 303(c) and I am sure would not object to the slight change in your language. Conceptually, our council has endorsed the approach set forth in your bill for a data collection system for fisheries not managed under FMPS.

Under your proposed revision of section 304 (a) and (b), again I prefer to withhold judgment until our council has reviewed this amendment language. I personally feel that your language appears to address the recommendations of our council as set forth in the attachments to this testimony.

We interpret your revisions to sections 305 (a) and (b) as follows: First, the proposed regulations are published for public comment when the plan is received and is under secretarial review, rather than after it is approved by the Secretary or approved through failure of the Secretary to act within 60 days. Public comment is received during the secretarial review period. Final implementing regulations are published immediately after approval. This differs considerably from the approach we recommended of a 30-day limitation on each of the following actions: Promulgation of proposed regulations 30 days after plan approval, a 30-day public comment period, and 30 days for secretarial review of public comment and promulgation of final regulations. Your language greatly speeds up this process and I am sure our council would approve of any action to speed up the system. However, personally I wonder if NMFS can comply within such a shortened time frame.

Basically our council concurred with the concept set forth in your revision of the section on emergency actions. We, however, felt that a two-thirds majority vote by the council should be adequate for emergency actions, rather than a unanimous vote which would be impossible for us, as one voting member has not attended for two years.

Our council has concurred with the other amendments proposed in your bill with the exception of those proposed for section 201(i)(3) which pertains to observer functions and section 311(a). We recommended that observer participation in scientific programs be limited to those species managed under the act. Our concern here was since NMFS is always short of scientific personnel, the terms "cooperation in scientific programs" may be too broadly interpreted so that personnel are used to study species not related to MFCMA, thereby diverting the observers from their primary duties. As indicated in the attached letters, we also favor retention of the reports on enforcement effectiveness as set forth in section 311(a).

I would like to note that we did support several other amendments suggested by H.R. 5002 and S. 1668 as indicated in the attached letter. I will mention for your consideration only one of these in H.R. 5002 to section 305(d), which would allow the Secretary to enter into cooperative agreements with the States to administer a permitting system. We favor this because the States are already registering boats and we see no need for another system.

I thank you for the opportunity to comment on behalf of our council. If we should have additional comment this will be forwarded to your staff as early as possible.

Attachment.

GULF OF MEXICO FISHERY MANAGEMENT COUNCIL,
Tampa, Fla., March 22, 1982.

Hon. ROBERT PACKWOOD,
Chairman, Committee on Commerce, Science, and Transportation,
U.S. Senate,
Washington, D.C.

DEAR SENATOR PACKWOOD: We are in receipt of your staff working draft of a Bill to amend the Magnuson Act. Since our Council will not meet until May 12–13, 1982, we will be unable to provide our comments on this Bill to you by April 2nd.

However, as the draft Bill incorporates certain provisions of H.R. 5002 and S. 1668, we are providing you with copies of our comment on these Bills. We will provide comment on the other provisions of your Bill immediately after our meeting.

Best regards.

Sincerely,

B. J. PUTNAM, *Chairman.*

GULF OF MEXICO FISHERY MANAGEMENT COUNCIL,
Tampa, Fla., March 16, 1982.

Hon. GEORGE J. MITCHELL,
Hon. WILLIAM S. COHEN,
U.S. Senate,
Washington, D.C.

DEAR SENATORS MITCHELL AND COHEN: The Gulf Council has reviewed S. 1668 and offers the following comments on the current draft of these amendments:

Section 301(a). The Council supports your proposed amendment to this subsection. We would, however, like to suggest one modification. We suggest the term "United States harvestors" be replaced by "*the United recreational and commercial fishing industry, including primary and secondary users.*" Our reason for suggesting this modification is that we feel that the secondary users (dealers, processors, charter vessels, taxidermists, etc.) are equally as dependent on the fishery as are the harvestors of primary users. Their interest should also be considered in allowing full utilization of the OY.

Section 301(b). The Council supports the intent of your proposed amendment to this subsection but feel that it should be modified and incorporate some of the language of H.R. 5002 as follows: "*The* guidelines *shall not have the force and effect of law* and shall not require mandatory compliance *by the Councils.*" The Council feels that the addition of the first phrase may prevent judicial interpretation of the guidelines as law in cases where the consistency of a plan to the national standards is challenged through litigation. The addition of the final phrase is to clarify that it is the Councils, rather than the secretarial review personnel, who are exempted from mandatory compliance. This may seem somewhat inconsistent, but the fact remains that the Secretary develops and publishes the guidelines to serve both as guidance to the Councils in preparing plans, and to secretarial personnel in reviewing plans. Because of deficiencies in the data base or other complicating factors the Councils may not be able to conform their plan to the exact letter of all provisions of the guidelines and should, therefore, be exempted from mandatory compliance, so long as the plan is consistent with the national standards. However, it would result in extreme chaos if the secretarial review personnel could completely ignore the guidelines and individually reinterpret the national standards insisting that the plans are thereby inconsistent. The purposes of the guidelines is to present the broadest possible interpretation of the national standards. The plans should be consistent with certain elements within this broad framework, but not necessarily all of them. If changes are needed in the guidelines used by secretarial review personnel to address new situations, then the guidelines should be amended by the Secretary.

Section 302(h)(1). The Council supports this proposed amendment but suggests modification of the final phrase as follows: ". . . ., such amendments to each plan as the Council deems necessary." This makes the portion of the statement which relates to amendments consistent with the portion on plans, i.e., the Council determines whether plan or amendments are necessary.

Section 302(h)(3). Our Council supports the language of this proposed amendment with no suggestion for change. We feel that the provision is primarily of benefit to other Councils as we have not experienced any difficulty in cooperatively holding hearings with other Councils in their jurisdiction.

Section 302(i) (New subsection). The Council enthusiastically endorses this new subsection.

Legal opinions rendered by counsels of the Department of Commerce have established that it is a legitimate function of a Council to review permit applications for development projects affecting the fisheries managed under FCMA. Our Council has limited our review and comment to major projects which have significant adverse impacts on these fisheries. In reviewing these possible consequences of these projects we have utilized the expertize of NMFS, F&WS, and state environmental assessment personnel. We have been judicious in rendering our comments and have suggested modification or mitigation where applicable. Some of our comments have not even been acknowledged by the Corps of Engineers, other required subsequent correspondence to gain even a bland letter of acknowledgement without any indication that our suggestions were considered.

We feel that your proposed amendment will rectify this untenable situation. Further it will statutorily support that such comment is a legitimate function of a Council. We feel that the 45-day response period is reasonable as it is longer than the 30-day period for public comment on such projects.

Section 302(j) (New Section). The Council enthusiastically supports this proposed new subsection exempting Councils from FACA and has no suggestion for change in language other than a concern over part of subparagraph (6). In subparagraph (6) the last phrase indicates that "copies of all reports received, issued or approved" shall be part of the minutes. We normally do not include these reports as part of our minutes, but refer to them by document number, date or other identifying characteristics. Such reports are filed separately and are part of our administrative record, but not necessarily as part of the minutes.

Section 303(b)(7) (New Section). The Council supports this proposed amendment which includes under the discretionary content of a FMP a statement of factors impeding full domestic utilization of the fishery. In certain of our fisheries there are technical fishery development needs, or marketing constraints, which impede full utilization by the domestic sector. a full discussion of these constraints should be useful to persons with authority to correct these limiting factors.

Section 303(c). Our Council supports this proposed amendment requiring that the Councils prepare and submit regulations.

Section 303(d). Our Council is adamantly opposed to this proposed amendment to the confidentiality of statistics provision of FCMA. We feel that there are very few instances where the Councils need access to individual, identifiable data for management. In such instances, should they occur. statistical personnel of NMFS could perform the required analyses.

It has taken years for NMFS to gain the trust of the industry that such data will be held as confidential. Representatives of the industry in our area are opposed to granting Councils access to these data and rightly so since the Councils are composed, in part, by individuals representing firms which are engaged in business competition with them. Limiting such access to Council staff is not satisfactory to our industry either since such staff are directly employed by the Council members. Our industry and our Council feels that such data should be available only to personnel of a government entity such as NMFS and only under the current provisions of federal law assuring confidentiality. Our Council, therefore, favors the amendment language of H.R. 5002 for section 302(f)(8) in lieu of your proposed amendment. This amendment does not alter Section 303(d) but assures confidentiality of statistics submitted directly to a Council.

Section 304 (a and b). Our Council has reviewed the proposed amendment language of S. 1668 for these subsections. We enthusiastically support the intent of your proposed amendment and feel that modification of these sections and of Section 305 are the major amendment changes needed in FCMA.

However, in our review of your proposed amendment to Section 304(a) we find what we view as procedural deficiencies, i.e., some elements of the proposed amendment language appear to more properly belong in Section 305. Further, the language appears to leave unresolved producres for promulgation of final regulations implementing the plan within a time certain. we have, therefore, suggested the following revisions to Sections 304(a) and 305 (a and b) which we present for your consideration.

"Section 304(a). ACTION BY THE SECRETARY AFTER RECEIPT OF PLAN.—(1) Any fishery management plan or amendment to such plan which is prepared by any Council shall be reviewed and either approved or rejected within a period of 60 days after its receipt by the Secretary. The Secretary shall review and notify the Council in writing as promptly as possible if it is his intention to reject such plan or amendment on the grounds that it is inconsistent with the requirements of the national standards, section 303(a) of this Act, or any other applicable law. Such notice shall specify with particularity (A) the national standard or other applicable law with which such plan or amendment is inconsistent, and (B) the nature of such inconsistency or deficiency. Such notice shall also set forth all recommendations of the Secretary detailing the actions which would conform such plan or amendment to the requirements of such applicable law and national standard.

"(2) The counting of the 60-day review period shall be interrupted as of the date the Council receives the Secretary's notice of his intention to reject, such plan or amendment until such Council shall have resubmitted such plan or amendment to the Secretary. The counting of the 60-day review period shall resume on the date the revised plan or amendment is received by the Secretary.

"(3) Unless otherwise specifically stated in such notice of intent to reject, transmitted to the Council within the 60-day period, the fishery management plan or amendment shall be presumed to be approved by the Secretary for purposes of Section 305(a)(1) and as not deficient and consistent with sections 303(a), the national standards, and all other applicable law.

"(4) After the Secretary receives a fishery management plan, or any amendment to such plan, revised by a Council in response to the Secretary's notice of intention to reject the original of such plan or amendment and the Secretary shall review such revisions to the plan or amendment within the remainder of the 60-day period. The Secretary's review of any revised plan or amendment shall be limited to determining whether such plan or amendment as revised by such Council in response to the Secretary's notice cures the inconsistency or deficiency detailed by the Secretary in such notice.

"(5) In the event the Secretary shall determine that any revised fishery management plan or amendment to any such plan does not cure the inconsistency or deficiency detailed in the notice of intent, the Secretary shall notify such Council in writing of his intent to reject such revised plan or amendment. Such second notice of intent to reject shall specify with respect to the revisions made by the Council the deficiencies in such revisions and with respect to any inconsistency with the national standards the exact nature of such inconsistency, and such notice shall set forth in detail all actions suggested to be undertaken by the Council to cure such deficiencies or such inconsistency.

"(6) Not later than 45 days after any Council receives a second notice of intent from the Secretary, such Council shall resubmit such fishery management plan or amendment to the Secretary revised so as to cure the deficiencies or inconsistencies contained in such notice or shall notify the Secretary of its intention to redraft such plan or amendment. Upon submission for approval by the Secretary any such plan or such amendment redrafted pursuant to this subsection shall be deemed to be a plan or amendment submitted under paragraph (1).

"(7) Nothing in this section shall be construed to require review of inseason adjustments required within the framework of an approved plan."

Section 305

"Section 305. Implementation of Fishery Management Plan.—(a) Within 30 days after the Secretary—

"(1) approves, pursuant to section 304(a), any fishery management plan or amendment; or

"(2) prepares, pursuant to section 304(b), any fishery management plan or amendment;

"the Secretary shall publish in the Federal Register (A) notice of availability of such plan or amendment, and (B) the proposed regulations prepared by the Council as required by section 303(c), any suggested substantive revision by the Secretary to the proposed regulations, and an explanation of such revisions. Interested persons shall be afforded a period of 30 days after such publication within which to submit in writing data, views, or comments on the plan or amendment, the proposed regulations, and any suggested revision to the proposed regulations.

"(b) Implementation.—The Secretary shall promulgate regulations to implement any fishery management plan or any amendment to any such plan after consideration of all relevant matters presented to him during the 30-day period referred to in subsection (a), including Council comment on revision of the regulations suggested by the Secretary. If the Secretary does not promulgate regulations to implement a fishery management plan or amendment within the 30-day period following the close of the 30-day period for public comment referred to in subsection (a), the proposed regulations prepared by the Council under section 303(c) with respect to the plan and published by the Secretary under subsection (a) shall be considered to have been promulgated by the Secretary effective on and after the day after the last day of such second 30-day period.

"To the extent practicable, such regulations shall be put into effect in a manner which does not disrupt the regular fishing season for any fishery."

What we have done through our proposed modification to the amendments is retain most of your language for plan review and approval in Section 304(a) but have transferred paragraph (8) to Section 305. We also concurred with your repeal of 304(b) since its language is now part of your amendment to 304(a). We have modified the language of 304(a) slightly to insure that review of plan consistency with the national standards was considered from the time the plan was received by the Secretary and included other changes which have eliminated the need for paragraph (7).

In Section 305 we concurred with your deletion of subsection (b), but incorporated much of the language of H.R. 5002 into subsections (a) and (c, which is now b). It appeared to us that failure to modify 305(a) in S. 1668 retained a major deficiency of FCMA, i.e., the Secretary could indeterminately delay publication of proposed regulations. In so much as this has been a very real problem in the past we are suggesting modifications as proposed by H.R. 5002, which limit the Secretary to 30 days in which to publish proposed regulations. Further, as pointed out previously, your repeal of Section 305(c) appeared to us to leave no mechanism for promulgation of final implementing regulations.

What we hope we have accomplished through the proposed language above is to have set forth the following orderly process: first, Section 304(a) requires secretarial review and approval of the FMP within a reasonable time period. Failure of the Secretary to act within this period results in a legal presumption of plan approval. Further, this section requires precise specification of the deficiencies of any plan disapproved by the Secretary within the time period and provides procedures for Council revision of such deficiencies and resubmittal of the corrected plan. Upon approval of the plan under 304(a) proposed regulations already submitted by the Council under 303(c) are published by the Secretary within 30 days for public comment (305[a]). The public is then allowed 30 days in which to comment and the Secretary has an additional 30-days in which to review such comment (including the Council comments), to modify proposed regulations and to publish final implementing regulations. Failure of the Secretary to act during this final 30-day period results in the proposed regulations, submitted by the Council and published by the Secretary, becoming the final implementing regulations.

Section 304(d) (Note: now designated as (c) by S. 1668). The Council supports your proposed language for amending this subsection which allows for permit fees above the administrative cost as a provision of limited access systems.

Section 304(f) (New Subsection). We support your amendment to provide a new subsection under which the Secretary may require reporting of certain fishery statistics for fisheries for which there is no plan. Actually much of these data are already being collected by NMFS under a voluntary system. Your amendment would allow collection of more detailed information should the need for such be demonstrated to the Secretary.

Section 305(e) (Note: now designated as (c) by S. 1668). The Council completely endorses your proposed language amending this section on "emergency actions". We do, however, suggest the inclusion of a concluding statement as follows: "(3) Nothing in these subsections shall affect the Secretary's authority to take emergency action for a fishery managed under a PMP." We feel that foreign fisheries managed under a PMP should continue to be managed by the Secretary until a Council FMP is approved for the fishery and that the Secretary should not be constrained from taking such emergency action as may be required.

Section 306(c) (New Section). The Council supports this proposed amendment clarifying that FMPs may be developed for fisheries largely in state territorial waters with concurrence of the states involved. The amendment does two things; first, allows this action upon concurrence of the states and, conversely, would appear to prohibit it if the states did not concur on the need for such management.

Section 311(a). The Council supports this proposed amendment. We feel that over time adequate enforcement will become the primary factor determining whether our fisheries continue to produce the optimum yield or decline in productivity. We feel that the reporting requirements contained in this amendment are necessary to assess the effectiveness of enforcement.

We compliment you both for being so responsive to the Council's suggestions for amendment of FCMA. We feel that these amendments are needed to resolve some of the administrative difficulties we have all incurred in operating under FCMA. We thank you for this opportunity to comment and may wish to provide additonal comment on subsequent revisions to the bill.

Sincerely,

B. J. **Putnam**, *Chairman.*

Gulf of Mexico Fishery Management Council,
Tampa, Fla., March 16, 1982.

Hon. **John B. Breaux**,
Chairman, Subcommittee on Fisheries and Wildlife Conservation and the Environment, Longworth House Office Building, Washington, D.C.

Hon. **Edwin B. Forsythe**,
Banking Minority Member, Subcommittee on Fisheries and Wildlife Conservation and the Environment, Longworth House Office Building, Washington, D.C.

Dear Messrs. Breaux and Forsythe: The Gulf Council has reviewed H.R. 5002 and offers the follwing comments on the current draft of these proposed amendments:

Section 2(b)(4). The Council is concerned over the possibility of a narrow interpretation of the term "U.S. fishing industry" and suggests this proposed amendment be modified as follows: "by the United States recreational and commercial fishing industry, including primary and secondary users."

Section 3(27). The Council supports the proposed amendment to the definition of "vessels of the United States."

Section 201(e)(2)(A)(i). The Council fully supports the proposed amendent to extend the certification definition to include foreign vessels fishing under ICCAT and similar treaties.

Section 201(i)(3). The Council endorses the proposed amendment extending the duties of observers to include enforcement; however, we feel that the concluding phrase should be modified as follows: ". . . and shall cooperate in carrying out such other scientific programs relating to the conservation of living resources covered under the provisions of this Act as the Secretary deems appropriate." The Council feels such a modification necessary to insure that NMFS does not divert the activities of the observers to scientific data collection for species which are not managed under the Act. Such scientific obsevations would seem inappropriate since funding is derived from activities related to harvest of species managed under the Act.

Section 201(i)(5). The Council supports the proposed amendment to this paragraph which creates a revolving fund for observer support upon which the Secretary may draw without the requirement for annual appropriation. We feel that this proposed action is the only way to insure an uninterrupted, continuing observer program.

Section 201(j) (New Subsection). The Council endorses this new proposed subsection which would allow foreign recreational fishing under the rules of the Secretary and states, without the requirement for GIFAs. Becuase of our proximity to foreign nations and the need for reciprocal fishing opportunity, we are particularly pleased with this proposed amendment. We do, however, suggest one minor modification of the concluding sentence as follows: "The Secretary shall consult with the affected Council, the Secretary of State and the Secretary of the department in which the Coast Guard is operating in formulating the conditions and restrictions applicable with respect to the FCZ." We make this suggestion for modification since we feel that the Councils will be intimately more familiar with the conditions existing in their fisheries than will be some representative of NMFS in Washington.

Section(b)(3)(B). The Council endorses the proposed amendment to add "hold capacity" to the informational requirements of permit applications.

Section 204(b)(4)(B&C). The Council has no position on the proposed amendment of paragraph (B) and endorses the proposed change to paragraph (C) which makes it discretionary by the Councils as to whether they wish to receive foreign permit applications.

Secton 204(B)(5). The Council supports the proposed amendment to this section which makes it discretionary for the Council to comment on permit applications. Most frequently for foreign permit applications affecting our fisheries, we have responded with a letter offering no comment.

Section 204(b)(10). The Council objects to the proposed amendment to these paragaphs since it would create a revolving fund for fisheries loans that would not be subject to Congressional oversight. We feel that the legislative process for allocating these funds is a basic part of the democratic system and more fully assures that equitable distribution of funds to the various regions will occur. Without such oversight some bureaucrat in Washington may be pressured into inequitable distribution of these funds. We prefer to see control remain with Congress.

Section 301(a)(1). The Council feels the amendment of National Standard 1 in this paragraph as proposed by S. 1668 and as modified by the Council is preferable to the amendment language of H.R. 5002. We suggest a revision as follows: "(1) Conservation and management measures shall prevent overfishing while allowing, on a continuing basis, the full utilization of the optimum yield from each fishery by the United States recreational and commercial fishing industry, including primary and secondary users." The Council feels that its proposed modification incorporates several important concepts. The first of these is, as suggested by the Council chairmen, the elimination of the word "achieving" and replacing it with "allowing" which we feel may moderate the current extremely narrow legal interpretation that fishing effort must be applied at a level to achieve OY. This type of interpretation has been a problem to some Councils in the past and results in our having to place more burdensome regulations on the domestic fishermen than is necessary. Further, we feel our suggested modification broadens your suggested amendment so that there is no doubt that both recreational and commercial segments are included in the "industry." Also, by including "secondary users", processors, etc., participate in the full utilization of OY as well as the harvestors, or primary users. Since the U.S. economy greatly benefits by the activity of these secondary users (dealers, processors, charter vessels, taxidemists, etc.) they should be-included in the benefits derived from full utilization.

Section 301(b). The Council suggests that the amendment language of H.R. 5002 and S. 1668 in regard to guidelines, be combined as follows: "The guidelines shall not have the force and effect of law and shall not require mandatory compliance by the Councils." The Council feels that the existing provisions of the Act are sufficiently precise as to the requirements for FMPs to be approved. There is no need for additional administrative requirements to become mandatory through promulgation of the guidelines. Further, we are hopeful that the language as proposed in H.R. 5002 will limit judicial interpretation of the guidelines as law.

Section 302(a, b & c). The Council supports the proposed amendments of H.R. 5002 which modifies these subsections by replacing the regional director (RD) of NMFS as a voting member of the Councils with an additional member appointed at large and which makes the RD a nonvoting member. We favor this action because currently there are changes proposed by the administration which would transfer the plan review and approval process to the RD. We fully support such action by the administration to regionalize this process. We feel that retention of a voting right by the RD may limit his effectiveness in reviewing and approving plans and should not be legally permissable. We feel as a nonvoting member he may effectively participate in the Council process.

Section 302(b)(2). The Council supports the proposed amendments to this paragraph which provide for announcement of new Council members appointed by the Secretary at least 45 days prior to their taking office and which further provide for removal of a Council member by the Secretary, for just cause, upon recommendation by two-thirds of the Council's voting members. We fail to see any reason why new members cannot be appointed in the time frame suggested by H.R. 5002. Such action is both reasonable and of great benefit to the Councils and newly appointed members. We also favor the provision for removal of a member and feel the proposed language provides both a safeguard for members who might become subject to removal for political reasons, if the Secretary exercise this power alone, and also a reasonable way to remove an unproductive member.

Section 302(d). The Council objects to this proposed amendment reducing compensation from the daily rate of a GS-18 to $100 per day. We object to this, not in a posture of personal gain, as none of us will serve indefinitely, but rather because of our concern over the impact on the Council system, a concern shared unanimously by all our members, including those receiving no such compensation. A daily compensation rate equivalent to the GS-18 level is not overly generous in these times of inflated costs and earnings, in fact, it is comparable or below consultant costs for similar experts. We do feel that the great majority of our members are selected for their expertise and experience and do constitute experts in their area of knowledge. We are doubtful that system will continue to attract individuals with such expertise if the compensation rate is reduced resulting in greater individual monetary loss during the periods they serve on the Council. It is our understanding that because of similar considerations, the daily compensation rate for persons serving on NACOA was recently raised from $100 per day to the GS-18 level.

Section 302(f)(6). While the Council fully supports the concept set forth in this proposed amendment, which excludes Councils from the provisions of the FACA, we feel the language of S. 1668 sets forth more effective procedures for assuring public notice and public participation. Basically, both House and Senate versions are similar except S. 1668 exempts confidential data from public inspection and it provides for closed meetings. We have included this subsection from S. 1668 for your consideration as follows:

"(J) PROCEDURES.—The Federal Advisory Committee Act (5 U.S.C. App. 1) shall not apply to the Councils, their scientific and statistical committees or their advisory councils. In order to assure public participation in its activities, each Council shall adopt the following procedures:

"(1) Each Council shall establish its own procedures with respect to the purposes, duties, and composition of its subcommittees, scientific and statistical committee, and its advisory panels.

"(2) Each Council meeting and each meeting of any scientific and statistical committee and each advisory panel shall be open to the public, except as provided in paragraph (7).

"(3) Timely notice of such meeting of a Council shall be published in the Federal Register except that Councils may meet without such notice in the event that the chairman and the vice chairman determine that an emergency exists. If such a determination is made, public notice shall be given by appropriate publication in the newspapers having the widest circulation in the major fishing ports of the Council's region and by such other means as will result in wide publicity.

"(4) Interested persons shall be permitted to file statements with the Council, the scientific and statistical committee, or any advisory panel of the Council.

"(5) Subject to section 552(b) of title 5, United Stated Code, and guidelines concerning the confidentiality of prescribed by the Secretary or by the Councils under section 303(d), the administrative record, including minutes of meetings, records, or other documents which were made available to or prepard for or by each Council, shall be available for public inspection and copying at a single location in the offices of the Council.

"(6) Minutes of each meeting of a Council shall be kept and shall contain a record of the persons present, an accurate description of matters discussed and conclusions reached.

"(7) Paragraphs (2), (4), (5), and (6) of this section shall not apply to any portion of a meeting of the Council, scientific and statistical committee, or advisory panel that is closed to the public in accordance with this subsection. A Council may close all or any portion of a meeting to the public upon 15 days' notice to the Secretary. Such notice shall be in writing and shall set forth the time and place of the meeting and the reason for closure. A meeting may be closed to the public for reasons of foreign policy, or for discussion of personnel matters, privileged or confidential information, or other matters listed in section 552(b) of title 5, United States Code".

Section 302(f)(8) (New Subsection). The Council highly supports this proposed new subsection which provides for adoption of procedures by the Council assuring confidentiality of statistics submitted to it. We compliment you for including only this provision and leaving unchanged the provisions relating to treatment of confidential statistical information submitted to the Secretary. We, of course, oppose the revisions of Section 303(d) as proposed by S. 1668 which forces the Secretary to share confidential data with the Councils. First, we do not believe the Councils need this individual, identifiable data for management or monitoring. Second, a mechanism already exists for selected members of Council staff to access these data through contract with NMFS, the provisions of which subjects the staff to maintain the same safeguards and makes them subject to the same civil penalities as NMFS personnel. Further, it should be pointed out that only two Councils appear to be currently constrained from availing themselves of these data, so it seems an administrative problem. And finally, we should point out that the commercial industry in our area is vehemently opposed ot such access by the Councils, but has learned to trust NMFS's assurances of confidentiality.

Section 302(h)(1). The Council, while endorsing the concept propoesded by H.R. 5002 for amending this subsection which provides for decision by the Councils on which fisheries will be managed, feels that language proposed by S. 1668 is better. Primarily our objection to H.R. 5002 language relates to paragraph B which provides for a data collection program (new Section 303(e) which we find to be unduly complicated and unnecessary. Other than that, the language of both bills is essentially the same. We favor the Senate version modified as follows: "(1) prepare and submit to the Secretary a fishery management plan with respect to each fishery within its geographical area of authority that the Council shall determine requires conservation and management through a fishery management plan and, from time to time, such amendments to each plan as the Council deems necessary;". This proposed Council modification follows langauge of (1)(C) in your amendment.

Section 302(h)(3). The Council, while supporting the concept of the proposed amendment in H.R. 5002, favors the Senate version as follows: "(3) conduct public hearings, at such times and locations as the Council shall determine necessary and appropriate, in order to allow all interested persons an opportunity to be heard in the development of fishery management plans and amendments to such plans, and with respect to the administration and implementation of the provisions of this Act;"

Section 302(h)(4). The Council supports this proposed change exempting it from the annual report requirement and presumes it is related to the similar amendment exempting the Secretary from his annual report to Congress. As a condition of our grant, we currently submit quarterly, semiannual and annual reports to NMFS.

Section 303(b)(6). The Council opposes the revision of this paragraph proposed in H.R. 5002. We feel the original language of the Act is sufficient. We recognize that what you are attempting here is to allow collection of higher fees for a limited entry system; however, we feel that it is more easily accomplished through the S. 1668 amendment to Section 304(d).

Section 303(c). The Council supports this proposed amendment requiring the Councils to prepare regulations.

Section 303(e) (New Section). The Council feels that this new subsection providing for data collection systems is unduly complicated and would result in much additional paperwork without materially altering the final Secretarial ruling of approval or disapproval. We favor the amendment language proposed by S. 1668 which adds a new subsection 304(f) as follows:

"(f) Additional Data Requirements.—Upon the request of a Council, the Secretary may by regulation require persons engaged in a fishery to submit to the Secretary data that would be pertinent to a fishery under Section 305(a)(5) and which the Council determines are necessary and appropriate for determining the need for a plan or for the preparation of a preliminary fishery management plan or preparation of a fishery management plan for the fishery." This language provides for the same discretion by the Secretary on whether to implement such a data system and no Council would make such a request without accompanying justification, so there seems no reason to formalize the process by requiring another document.

Section 304(a). The Council appreciates the subcommittee's action in addressing our major concern over delays in the plan review and approval process. We, however, favor a modified version of the S. 1668 approach to amendment of 304(a & b). Our suggestion for language replacing subsections (a) and (b) is as follows:

"Section 304(a). Action by the Secretary After Receipt of Plan.—(1) Any fishery management plan or amendment to such plan which is prepared by any Council shall be reviewed and either approved or rejected within a period of 60 days after its receipt by the Secretary. The Secretary shall review and notify the Council in writing as promptly as possible if it is his intention to reject such plan or amendment on the grounds that it is inconsistent with the requirements of the national standards, section 303(a) of this Act, or any other applicable law. Such notice shall specify with particularly (A) the national standard or other applicable law with which such plan or amendment is inconsistent, and (B) the nature of such inconsistency or deficiency. Such notice shall also set forth all recommendations of the Secretary detailing the actions which would conform such plan or amendment to the requirements of such applicable law and national standard.

"(2) The counting of the 60-day review period shall be interrupted as of the date the Council receives the Secretary's notice of his intention to reject such plan or amendment until such Council shall have resubmitted such plan or amendment to the Secretary. The counting of the 60-day review period shall resume on the date the revised plan or amendment is received by the Secretary.

"(3) Unless otherwise specifically stated in such notice of intent to reject, transmitted to the Council within the 60-day period, the fishery management plan or amendment shall be presumed to be approved by the Secretary for purposes of Section 305(a)(1) and as not deficient and consistent with sections 303(a), the national standards, and all other applicable law.

"(4) After the Secretary receives a fishery management plan, or any amendment to such plan, revised by a Council in response to the Secretary's notice of intention to reject the original of such plan or amendment and the Secretary shall review such revisions to the plan or amendment within the remainder of the 60-day period. The Secretary's review of any revised plan or amendment shall be limited to determining whether such plan or amendment as revised by such Council in response to the Secretary's notice cures the inconsistency or deficiency detailed by the Secretary in such notice.

"(5) In the event the Secretary shall determine that any revised fishery management plan or amendment to any such plan does not cure the inconsistency or deficiency detailed in the notice of intent, the Secretary shall notify such Council in writing of his intent to reject such revised plan or amendment. Such second notice of intent to reject shall specify with respect to the revisions made by the Council the deficiencies in such revisions and with respect to any inconsistency with the national standards the exact nature of such inconsistency, and such notice shall set forth in detail all actions suggested to be undertaken by the Council to cure such deficiencies or such inconsistency.

"(6) Not later than 45 days after any Council receives a second notice of intent from the Secretary, such Council shall resubmit such fishery management plan or amendment to the Secretary revised so as to cure the deficiencies or inconsistencies contained in such notice or shall notify the Secretary of its intention to redraft such plan or amendment. Upon submission for approval by the Secretary any such plan or such amendment redrafted pursuant to his subsection shall be deemed to be a plan or amendment submitted under paragraph (1).

"(7) Nothing in this section shall be construed to require of inseason adjustments required within the framework of an approved plan."

We feel that this language would come closer to resolving the problems experienced by the Councils. Certain elements of the original language of S. 1668 for amendment of these subsection we have transferred to Section 305.

Section 304(c)(C) (New Subparagraph, Note: c renumbered as b). Because of the delays involved in developing an FMP, the Council does not think such action by the Secretary is appropriate for emergencies and favors the S. 1668 revision to Section 305(c) with the addition of a pargraph (3) as follows: "(3) Nothing in these subsections shall affect the Secretary's authority to take emergency action for a fishery managed under a PMP."

Section 304(d) (Note: renumbered c). The Council supports the portion of the H.R. 5002 amendment which allows for cooperative agreement with the states for administering a permit system. However we favor the S. 1668 amendment which modifies the Act's language on fees by adding the following phrase: ", except that fees at levels exceeding administrative costs may be established as part of limited access pursuant to Section 303(b)(6)." We feel when, and if, a limited access system was developed that justification for the fee level would be required in the plan or amendment and the simple modification proposed by S. 1668 is sufficient to authorize implementation of such action.

Section 305(a)(b). Because of modifications of amendment language suggested by the Council under Section 304(a), we have modified Sections 305(a) and (c) as follows and have deleted Subsection (b), renumbering c as b:

"Section 305. IMPLEMENTATION OF FISHERY MANAGEMENT PLANS.—(a) Within 30 days after the Secretary—

"(1) approves, pursuant to section 304(a), any fishery management plan or amendment; or

"(2) prepares, pursuant to section 304(b), any fishery management plan or amendment;

"the Secretary shall publish in the Federal Register (A) notice of availability of such plan or amendment, and (B) the proposed regulations prepared by the Council as required by section 303(c), any suggested substantive revision by the Secretary to the proposed regulations, and an explanation of such revisions. Interested persons shall be afforded a period of 30 days after such notice within which to submit in writing period of 30 days after such notice within which to submit in writing data, views, or comments on the plan or amendment, the proposed regulations, and any suggested revision to the proposed regulations.

"(b) IMPLEMENTATION.—the Secretary shall promulgate regulations to implement any fishery management plan or any amendment to any such plan after consideration of all relevant matters presented to him during the 30-day period referred to in subsection (a), including Council comment on revision to the regulations suggested by the Secretary. If the Secretary does not promulgate regulations to implement a fishery management plan or amendment within the 30-day period following the close of the 30-day period for public comment referred to in subsection (a), the proposed regulations prepared by the Council under section 303(c) with respect to the plan and published by the Secretary under subsection (a) shall be considered to have been promulgated by the Secretary effective on and after the day after the last day of such second 30-day period.

"To the extent practicable, such regulations shall be put into effect in a manner which does not disrupt the regular fishing season for any fishery."

In this revision we have retained most of the amendment language of H.R. 5002. We suggested deletion of Subsection (b) since this provision has never been invoked and as it allows indeterminate delay by the Secretary in postponing implementation of a plan. The public has ample opportunity to comment in the public hearings on the draft plan and again to the Secretary on proposed regulations. The Secretary has opportunity to respond to the public concerns under Subsection (b) (above) by promulgating modified final implementing regulations within the 30-day period following public comment. Under this condition, such regulations are not necessarily those proposed by the Council, but are the secretarial regulations after considering such concerns. Only through his failure to act within the final 30 days do the Council's proposed regulations become the implementing regulations.

Section 305 (e)(3 & 4). As indicated previously, our Council favors the S. 1668 amendment to Section 305(e) over the H.R. 5002 amendment language.

Section 305(f). Our Council supports this proposed amendment to repeal Subsection (f) which required an annual report by the Secretary to Congress.

Section 305(h)(New Section). The Council supports the addition of this subsection stating that the time requirements imposed on secretarial review, approval and implementation of plans regulations shall not be affected by requirements of the Paperwork Reduction Act, Regulatory Flexibility Act or Ececutive Order 12291. Inclusion of the amended language will certainly induce the secretarial staff to review plans and supporting documents concurrently and in relation to the requirements of these laws.

Section 3069(c). The Council fully supports the first portion of the H.R. 5002 amendment to this subsection which extends state management authority to certain enclaves. In our previous testimony before your committee we pointed out the severe enforcement problems which would be created by these enclaves of FCZ within state waters. We feel that this is one of the more important amendments to the Act. In the second proposed change to this subsection we suggest the following modification of your language: "or numbered under the Federal Boating Safety Act of 1971 *in that state* (46 U.S.C. 1451 et seq.)." We feel that the language as originally drafted could be construed to imply that a state exercised regulatory control over all vessels numbered under the Federal Boating Safety Act irregardless of the state in which they were registered or numbered.

Section 309(b). The Council opposes this proposed amendment to eliminate the imprisonment provision applying to foreign persons violating FCMA. We feel it is discriminatory to maintain such imprisonment penalties for domestic fishermen and eliminate those for foreign fishermen. In general, we see nothing wrong with retaining all the imprisonment provisions, especially as the trial judge may use his own discretion in determing if the offense merits imprisonment. Basically, we feel that penalties should be compatible for both foreign and domestic fishermen.

Section 311(a). Our Council opposes the H.R. 5002 amendment to repeal the reporting requirement on enforcement compliance. We feel that over time adequate enforcement will become the primary factor determining whether our fisheries continue to produce the optimum yield or decline in productivity. Without an annual or periodic assessment (or report) it will be most difficult to determine the effectiveness of enforcement. We, therefore, favor the proposed revision of Subsection (a) in S. 1668, which we feel will provide the type of assessment information needed by the managers and which will also be needed by Congress for consideration in the budgetary process.

We commend you and your staff for your excellence in setting forth needed revisions to FCMA. We, as a Council, unanimously support either the language or intent of most of your proposed amendments. We have disagreed with a few of the others but hope we have provided adequate justification for our actions so you will reconsider the consequences of these proposed amendments. We feel strongly that amendment of Sections 304 and 305 should be given the highest priority and hope our comments on these sections are helpful. We greatly appreciate the opportunity to comment and may wish to provide additional comment on subsequent revisions to the bill.

Best regards.

Sincerely,

B. J. PUTNAM, *Chairman.*

The CHAIRMAN. Thank you very much.

Let me say to the other witnesses, you were very good about getting your statements in and I have had a chance to read them all, and I have outlined where you disagree with the bill. In most cases you agree with each other in your disagreements with the bill.

There are some slight differences. Those are very clearly geographic. In one or two cases I can see where a council has a unique, almost personal problem. But I would appreciate it if in your comments you would say where you disagree with us, rather than where you agree.

Mr. Carroll.

Mr. CARROLL. Good morning, gentlemen. Mr. Chairman and members of the committee:

My name is Pat Carroll. I come from the State of Connecticut and for the past 2½ years I have had the privilege of sitting as a member of the New England Council, and I appear before you today as vice chairman, representing the council. With me is our executive director, Doug Marshall.

I do not know that I can testify at the speed of Mr. Putnam, but I will do my best. We have submitted earlier to the committee staff our proposed testimony. In the interest of saving time I will not try to summarize that rather detailed document, but I do wish to make a few brief and general comments.

The opening paragraphs of our testimony address general problems in the implementation of the act and the operation of the council system. It may appear that the tone of these paragraphs indicates an adversary relationship between the National Marine Fisheries Service and the councils, or at least our council.

This, however, is not the case. We generally have common goals of conserving the resource for the benefit of the Nation and assuring that the regulations necessary for conservation purposes impose the lightest possible burden on those regulated. Our testimony should be read and considered in that context.

In preparing the written testimony we have submitted, our council has not only addressed the committee bill under consideration here today, but also S. 1668, introduced earlier by Senators Mitchell and Cohen from Maine, and H.R. 5002. There are three basic issues addressed in our testimony.

The first is the respective roles of the councils and the Secretary. We believe the Congress intended the councils to be policymaking bodies for fisheries management in their respective regions and to have considerable independence from NMFS control in the performance of these responsibilities.

The second basic issue is the application of ancillary acts and orders to the fisheries management process under the Magnuson Act. Very frequently, the provisions of such acts and orders complicate the process unnecessarily and thereby delay implementation of management plans or amendments. I believe the procedures defined in the act itself and the practices developed by NFMS and the councils make the applications of these acts unnecessary.

The third issue is the lengthy period of time presently involved in the Secretary's review and implementation of management plans. Our detailed testimony reflects the New England Council's views on how well the changes proposed in the various bills would address these three major areas of concern.

Finally, I would point out to you that we have also commented on problems relating to travel expenses and authorizations and to council staffing levels. While not address in either of the bills, we feel that these concerns should be considered by the Congress for clarification.

Once again, on behalf of the council, thank you very much for the opportunity to be here today.

[The statement follows:]

STATEMENT OF PATRICK CARROLL, VICE CHAIRMAN, NEW ENGLAND FISHERY MANAGEMENT COUNCIL

Mr. Chairman, members of the Committee: Our Council appreciates the opportunity to present to this Committee our views on the reauthorization of the Magnuson Act and on the amendments that have been proposed to the Act both in the Senate and in the House of Representatives.

The New England Fishery Management Council played a major role in the joint efforts of the eight Councils that culminated in the proposals for MFCMA amendments that were submitted jointly by the Councils in July 1981. We have followed subsequent Congressional actions on amendments to the Act; and after reviewing both the House and Senate bills, we wish to offer a number of comments. We would like to first address some basic issues in fairly broad terms and then to comment specifically on the proposals for amendments that are contained in the House bill (H.R. 5002) as marked up in Subcommittee, Senate bill (S–1668) and the Senate Commerce Committee staff draft.

Our Council has experienced great frustration almost since its establishment, in trying to carry out its responsibility under the Act. There are many specific cases, and there are a variety of reasons for or causes of our difficulties. We feel all these individual causes may be categorized either as (1) disagreements or uncertainty about the respective roles of the National Marine Fisheries Service and the Council or (2) administrative and procedural requirements within the process that have led to inordinate delays and in many cases to the Council's wishes and intent being thwarted.

We have often felt that when Council wishes coincide with those of NMFS, things progress very smoothly; but that when officials of NMFS disagree with a Council decision, that decision is blocked or delayed procedurally. We also perceive that there are different standards of review for PMPs and amendments prepared by NMFS than those applied to FMPs and amendments prepared by Councils.

It has long seemed to our Council that the problems encountered as a result of procedural requirements come only in part from the provisions of the Act, from NEPA, from the APA, from FACA and so on. A substantial part of the difficulty flows, it seems to us from an overly zealous, and sometimes differential, application of those statutes. The same impression applies to the application of E.O. 12044 and its successor E.O. 12291.

In trying to deal with the frustrations we encountered, we concluded that there was a certain amount of ambiguity in the Act itself regarding the role of the Councils and the role of the Secretary. We also observed that although Section 304 specified time frames for Secretarial decisions regarding approval or disapproval of FMPs, those time frames had no practical effect. Review of plans and amendments seemed interminable. Plans and amendments were either rejected or returned for modification after lengthy delays. Frequently the changes required were changes to an environmental impact statement or other impact analyses. Although the changes would not alter the Council's decisions or implementing measures, they did, however, delay the effective date of implementation by many months in some cases.

At the invitation of a member of the New England Congressional delegation, we set out to try to find a solution to the problems as we perceived them and concluded that in general, the Council's prerogatives and role should be clarified and also that the Secretary's role should be more clearly (and hopefully more narrowly) defined. We also concluded that the Federal Advisory Committee Act served no real purpose in its application to the Council, that although environmental protection ranks very closely behind motherhood, there is virtually nothing in FMPs or in fisheries management under the Act that threaten or degrades the environment; and that overzealous application of a variety of ancillary acts and orders was, in fact, preventing the effective execution of the explicit mandates of the Act itself.

We invited a dialogue with the other Councils that resulted in joint discussions at Chicago, Illinois, and Homer, Alaska, in mid-1981. From these meetings came the consolidated list of proposed amendments submitted to the Congress at your request last July. During those inter-Council discussions it became quite clear that the problems addressed in that consolidated list were common to all or most of the Councils and that other matters were perceived as problems only by some of the Councils.

It is our view that each Council is a policy making body for regional fisheries management and for establishment of detailed measures to carry out the policies established. As long as Council decisions can be delayed or frustrated or thwarted for any reason other than inconsistency with the National Standards, something is wrong. We believe the various amendments proposed will be an important step toward resolving many of the problems identified by the Councils and others, including the Congress.

In our judgment the extent of NMFS control over the Councils is unfortunate. It is not surprising that the Department of Commerce is on record as saying that it does not believe most of the amendments proposed are necessary and that the problems addressed can be easily solved administratively. However, NMFS officials have always had the opportunity to correct these problems administratively if they could do so. Their failure to do that has led the Councils to conclude that basic changes to the Act are necessary.

NMFS controls Council funding through the grant procedure, and ultimately control of funds means considerable control of many other aspects of Council operation. We believe that Congressional clarification of its intent regarding the role of the Council and the relationship of the Secretary and the Councils is sorely needed. If the Councils are indeed to set policy and decide implementing measures, then the Secretarial and NMFW roles should be to expedite, facilitate and assist—not to delay, obstruct and complicate.

We are aware of the purposes of, and the safegurards built into, NEPA, FACA, the Paperwork Reduction Act, the Regulatory Flexibility Act, and the relevant Executive Orders. We are convinced that the process of development of fishery management plans, as it has evolved and as it works—in New England at least—is fully sensitive and responsive to the intent and the spirit of those prevailing Acts and Orders. Therefore, we believe that further procedural roadblocks as specified under these Acts are inefficient, unnecessary and duplicative.

With the foregoing comments as background, we would like to express our preferences among the various amendment proposals, section by section.

With regard to Section 201(d)(4)(B), we support the change proposed in the House bill. We believe such a change will allow more flexibility to the United States in dealing with allocations to foreign nations.

We also believe that there is a need for a change in Section 201(e) to allow for partial release of allocations and for reduction allocations, but the Council has not developed a consensus whether the House proposal to amend subsection (1) or the Senate proposal to add a new subsection (3) is preferable.

The House clarification proposed in Section 201(e)(2)(A) regarding the different certifications is useful and should be adopted.

We also endorse the proposal to amend section 201(i)(3) to expand and clarify the role of U.S. observers on foreign fishing vessels. We prefer the term "compliance" in the Senate proposal over the House use of "enforcement." We also agree with both House and Senate changes to make the Secretary's use of Foreign Fishing Observer Fund exempt from annual appropriations. We recognize the problems in dedicated funds and open-ended availability, but we believe the problems involved in foregin fishing activities in the FCZ justify this as an exceptional case.

The Council strongly supports the addition of a new subsection (j) Section 201, to allow for controlled recreational fishing by foreign fishermen and vessels. We believe the proposal in the Senate draft answers substantially all the objections raised by NMFS to original language in the House bill, and we endorse the Senate language.

We endorse the proposal by both Houses to add "hold capacity" to the information required by Section 204(b)(3)(B) in foreign permit applications.

With respect to changes proposed to Section 204(b)(4), we endorse the House proposal regarding Federal Register notices of foreign applications. We believe 204(b)(4)(B) should not deleted. Concerned Councils should not have to request copies of permit applications but should receive them automatically as should the Coast Guard. We do not object to deletion of the present requirement in 204(b)(4)(C) for copies of permit applications to be transmitted to the concerned Senate and House Committees. We also concur with the proposed amendment to Section 204(b)(5) to make Council comment on permit applications discretionary ragher than mandatory. Our Council also endorses the change proposed to Section 204(b)(10) by the House bill.

In Section 301(a)(1), the New England Council prefers the proposal in S. 1668 over the House version. In 301(b) we believe the added sentence should read: "Compliance with such guidelines shall not be mandatory." Despite the NMFS view that this change is not necessary, we strongly urge its adoption.

Our Council supports the proposal in H.R. 5002 to change the Council Seat for the NMFS Regional Director to a non-voting seat. This seems particularly appropriate if NMFS grants the Regional Directors increased authority in the review and approval of plans and amendments.

With regard to proposals in H.R. 5002 to change the number of appointed members, the New England Council does nto believe there should be additional voting members appointed (at least in the case of our Council) even if the Regional Director becomes a non-voting member. Without the Regional Director we would have 16 voting members; but since the Chairman only votes to break ties, we effectively would have an odd number of 15 votes.

Without preference for either House or Senate language, we support amending section 302(a)(8) to include the Northern Mariana Islands on the Western Pacific Council.

We endorse the proposal in H.R. 5002 and in the Senate Staff Draft to amend Section 302(b)(2) to require announcement of new Council appointments 45 days prior to the beginning of new Council terms. However, we suggest that it be made clear in the Act itself that, in the case where an appointment is needed to fill an unfinished term due to loss of a Council member, the new member would assume his responsibilities immediately upon appointment. Our Council also supports a new provision in this section to allow removal of Council members for cause upon a two-thirds recommendation of the voting members of a Council. Our Council has not developed a consensus on the Senate Staff Draft provision that would give the Secretary authority to return a Governor's nomination list if he determines that the list does not contain three qualified nominees for each Council vacancy. There is considerable sympathy for the implicit goal of getting nominations of truly qualified persons, but there is also a reluctance among our members to see the Secretary placed in a position to override the judgments of the Governors. We have noted that nominations in recent years have included well-qualified people. There is also no clear explanation in the amendment of what would happen if a Governor refused to revise or resubmit a list of nominees returned by the Secretary.

We are adamantly opposed to reducing the Council level of compensation described in Section 302(d) for members who are not government employees. It is our understanding the NACOA was used for comparison in deciding to include this proposal in H.R. 5002. The Councils are not advisory bodies and cannot be compared to NACOA. In any case we understand that the compensation level for NACOA members has since been increased.

In Section 302(d) and Section 302(f)(7) (A) and (D) there are references to "actual expenses." A considerable controversy has persisted as to whether this term was intended to be interpreted by a dictionary and common usage definition, or by the definition of "actual expenses" contained in the federal travel laws where the term refers to costs incurred up to a specified maximum. Despite a NOAA General Counsel legal opinion that Congress clearly intended the former, NMFS as a matter of agency policy has interpreted it in the narrower sense of the Standard Government Travel Regulations. This matter should be clarified in the Act or in legislative history. We recommend that Councils be authorized to establish their own procedures in this matter.

A related but distinct and separate issue must be mentioned. This involves an example of how NMFS exercises its powers. As a condition of the grants through which the Councils receive their funding, in order to pay expenses exceeding the standard federal per diem rates in areas not designated as high rate geographic areas, Councils must obtain the prior approval of their travel orders from the appropriate Regional Director. Although we are not aware of any case where approval has been withheld or denied, this is an unnecessary requirement and can only be construed as another example of the desire of the NMFS to have tight control over the Councils and their operations. We would very much like to see it made clear that the Councils have authority to make such decisions themselves.

Although no amendment of Section 302(f)(1) has been proposed by either House of Congress, we believe Councils should have the authority to set their own staff requirements without reference to NMFS or the Secretary. Each Council functions in a somewhat different manner and may have differing personnel needs. This section simply enhances the ability of the NMFS to execise control over the Councils. We suggest the word "Secretary" be replaced by the world "Councils."

In Section 302(f)(6) changes are proposed by H.R. 5002. We believe that the language in S. 1668 adding a new Section 302(j) PROCEDURES is much more in line with the recommendations of the eight Councils. We therefore recommend that the

Senate version be adopted to exempt the Councils from FACA and to establish rules for assuring public access and input into the Councils' activities. The language in S. 1668 reflects very closely the views of our Council. We disagree completely with the contention of the NMFS that there is no need for this amendment. Eight Councils, eight scientific and statistical committees, and eight advisory panels are presently treated as Advisory Committees under FACA. This means 24 Charters and the required annual reports—all of which serve no useful purpose and which require considerable time and expense.

Furthermore the continued application of FACA tends to perpetuate the mistaken view that the Councils are advisory bodies rather than policy-setting bodies. Contrary to the assertions of NMFS, the FACA rules have created problems in the operations of some Councils.

Our Council does not recommend the new Section 302(f)(8) proposed in H.R. 5002. We prefer the new Section 303(d) that is proposed in S. 1668.

Both H.R. 5002 and S. 1668 propose a change to Section 302(h)(1) of the Act. The New England Council strongly prefers the language in the House bill. Our preference is related to the provisions for a data collection program in the proposed new subsection (b). We are, however, very strongly opposed to the deletion of the words "in the judgement of the Council" from the proposed new subsection (a). We understand that NMFS contends that such language is not necessary and that the House Subcommittee has deleted those words from H.R. 5002 in markup. We believe that the Council should have the authority to decide whether a plan needs to be developed and that this should be explicit in the Act. There have been occasions when NMFS has thwarted a Council decision to develop a plan, substituting its judgement for that of the Council. We would not object to a system such as that proposed in the Senate Staff Draft that would require a plan for each fishery but would allow a Council to decide with Secretarial concurrence that no plan need be done.

In Section 302(h)(3) we believe that S. 1668 version is preferable to the House version.

We heartily endorse amending Section 302(h)(4) to delete the requirement for an annual report. The report is a nuisance that consumes staff time and energy and serves no useful purpose.

Our Council recommends the proposed new Section 302(i) contained in S. 1668 and 302(j) in the Senate Staff Draft be retained.

H.R. 5002 would amend Section 303(b)(6) to contain specific authorization for vessel buy back programs that could be funded through the fee schedule and that could be administered by the States concerned. H.R. 5002 would also add a new Section 303(e) to the Act, establishing a Vessel Buy Back Fund and would amend Section 304(d) by leaving the door open to fees collected under a limited access system being higher than administrative costs and would permit state administration of a permit system for domestic fishing vessels and retention by the state or states of fees collected under such a permit system.

S. 1668 proposes to amend the present Section 304(d) by allowing fees at levels exceeding administrative costs if they are established as part of a limited access system.

The Senate Staff Draft woudl also amend Section 303(b)(6) to specifically allow any limited access system to include a vessel buy back program to be administered by the Secretary and funded through the fee schedule. That proposed bill would also amend Section 304(d) to allow fees charged in a limited entry permit system to exceed the adminsitrative costs.

These various proposals for amendments relating to limited entry programs and the attendant fee schedules have been discussed by our Council, and the Council voted unanimously to oppose all of them. We urge that all of those proposals be removed from the bills at hand since the full implications, including implications for state-federal relations, are not well understood.

The New England Council prefers the language of S. 1668 to amend Section 303(b)(7) over the comparable language in H.R. 5002.

Our Council proposed the requirement that proposed regulations be mandatory with each plan or amendment prepared by a Council. We endorse the language of H.R. 5002 to amend Section 303(c). We have not fully considered the implications of the proposal in the Senate Staff Draft (the authorization bill) to make such proposed regulations a part of the plan or amendment for review and implementation purposes. If such a procedure would shorten the process of review and implementation without imposing new burdens, we would endorse it.

We endorse the proposal in S. 1668 to amend Section 303(d). That language is in line with the joint Council recommendations regarding the issue of confidentiality. We strongly urge its adoption. There has been a longstanding disagreement between our Council (and others also) and NMFS on what data is necessary and on how it shall be handled. Our view is that since the Councils are charged with preparation of management plans, they are in the best position to determine what data is necessary for Council staff to perform the analytical work required to support those plans. The Act empowers the Council to describe in a plan what data will be required from the industry. We do not believe the Councils are likely to impose unreasonable data requirements.

Although we see no need for any Council member's access to data, we believe the technical staff of the Councils must have full access to whatever data is actually collected in all its forms. NMFS wishes to deny Council staff access to unaggregated material in the name of protecting confidentiality. We believe that analytical requirements imposed by ancillary acts and orders (and by NMFS itself) necessitates the use of unaggregated data. We further believe there is no increased risk of a breach of confidentiality by Council staff access to such data.

We suggest that the confientiality of such data be protected by a provision in the Act that would specify that such data could only be released pursuant to a court order sought by a federal agency.

The Council believes that Councils should be able to make a determination that data or information is not sufficient either to determine whether a management plan is necessary or that it is not adequate for preparing a plan. Once such a determination is made, a data collection program should be set up. We have expressed endorsement earlier of the proposed amendment of Section 302(h)(1)(B) in H.R. 5002 and of the new Section 303(f) proposed in that bill. We prefer that to the Senate Staff Draft proposal to add a new 303(f) for the same purpose. We also urge restoration to the House bill the final sentence of the proposed language for Section 303(f)(2) that was deleted from the bill in Subcommittee markup.

During the joint Council discussion of the problems we had identified in the operations of the Councils, much attention was devoted to the process of the Secretarial review of plans and amendments. The proposal contained in S. 1668 to amend Sections 304 (a) and (b) of the Act, reflect closely the changes suggested by the Councils. Our Council has endorsed that language; but although that is our preferred language, we are less concerned about the specific language than we are with the basic goal of speeding up the review process and avoiding the very substantial delays that have occurrred in many cases in the past. We believe that specific and binding language limiting the amount of time that may be taken for the Secretarial review is necessary. We are aware that NMFS and the Secretary argue that the time periods contained in either of the Bills are not sufficient for Secretarial review. We disagree. The NMFS is intimately involved in the Council's preparation of every fishery management plan, both in the person of the Regional Director as a Council member and in consultations between Council staff and NMFS staff. There are no surprises in FMPs and no reason a prompt review cannot be conducted.

Our Council does not recommend adoption of the proposed language of H.R. 5002 to amend Section 304(c)(1)(C). We prefer the language of S. 1668 that would amend the existing Section 305(e) to provide for emergency actions.

With respect to the new Section 304(f) proposed in S. 1668, we have expressed, above, our preference for the House bill's provisions relating to data requirements and programs (in Section 302(h)(1) and 303(e)).

In looking at Section 305 of the Act our Council purpose has been, as it was with Section 304, to seek changes that will be most effective in speeding up the implementation of plans once they have been prepared and submitted by the Councils to the Secretary. We believe that with respect to existing Section 305 (a), (b) and (c), the changes proposed in the Senate Staff Draft will be most effective, and we recommend they be adopted in preference to other language.

As we have noted above, our Council endorses the provision in S. 1668 that would amend Section 305(e) regarding emergency actions. The language in that bill closely reflects the recommendations of the eight Councils acting jointly, and we prefer it over either the House bill or the Senate Staff Draft language.

We are pleased to endorse elimination of the annual report required by Section 305(f), and we urge adoption of the language in H.R. 5002 to that effect.

The New England Council strongly supports the addition of a new Section 305(h) in H.R. 5002 and Section 305(g) in the Senate Staff Draft that will exempt the review and implementation of plans and amendments from the provisions of the Paperwork Reduction Act, the Regulatory Flexibility Act and Executive Order 12291. We believe that this will be of great benefit in reaching the common goal of speeding up plan review and implementation and that this is among the most significant and important of all the proposals for amendment that are being considered.

The Council endorses the proposal in H.R. 5002 and in the Senate Staff Draft to amend Section 306(a) to provide for state management authority in FCZ enclaves in waters under State management authority.

H.R. 5002 proposes a new Section 306(c) to the Act that would establish new rules concerning foreign processing vessels operating in internal waters. Although the proposed measure seems to represent a compromise between the views and interests of harvesters on the one hand and processors on the other, our Council has not adopted a position on this proposal and has no recommendation at this time.

Our Council has endorsed the proposal in S. 1668 to create a new Section 306(c) that would expressly recruit Council-State plans for shared fisheries. We recommend that the proposed language be modified slightly as follows: in line 2 after "constituent States" insert "or its Marine Fisheries Commission."

We have no objection to the change proposed by H.R. 5002 and by the Senate Staff Draft to conform Section 307(2)(A) to recreational fishing by foreign vessels.

The Council does not object to the new Section 308(e) proposed by H.R. 5002 to provide for subpena power for the Secretary in connection with hearings under Section 308.

We concur with the provision in both House and Senate bills that would amend Section 309(b) to delete imprisonment for fishing offenses.

We also endorse amendment of Section 310(a) to allow forfeiture of the value of fish seized in connection with certain violations, rather than requiring that the fish themselves be forfeited.

The Council recommends reauthorization of appropriations for the Act generally at the levels that are currently being proposed by the two Houses of Congress.

Finally, Mr. Chairman, our Council has no objection to the proposed amendment to the Atlantic Tunas Convention Act of 1975 that is contained in H.R. 5002 and in the Senate Staff Draft.

I thank the Committee on behalf of the New England Council for the opportunity to make our views know on the vital issues at stake in the proposals to amend the Magnuson Fishery Conservation and Management Act.

Attachment.

NEW ENGLAND FISHERY MANAGEMENT COUNCIL,
Saugus, Mass., December 22, 1981.

MEMORANDUM

To: Executive Committee
From: Douglas G. Marshall, Executive Director.
Subject: Travel of Council Members, SSC, Advisors and Staff.

I would not burden the entire Council with such a long memorandum, but I believe the subject is important enough to warrant all of you reading it prior to our next meeting on January 5.

The Act says [Section 302(d)]: Voting members of each Council and the ASMFC representative shall be reimbursed for actual expenses. Other non-voting members of the Council may be reimbursed for actual expenses (although this provision regarding other non-voting members was added by Amendment in 1980). (This Section does not mention reimbursement of staff.)

Section 302(f) says: (6) Each Council shall determine its own organization and prescribe its practices and procedures for carrying out its functions under the Act, in accordance with such uniform standards as are prescribed by the Secretary. (7) The Secretary shall pay—(D) The actual expenses of the members of the SSC and the Advisory Panel. (Again, no mention of reimbursement of staff, but 302(f)(6) would seem to give the Council discretion to reimburse staff however the Council sees fit.)

NMFS has said very different things at different times since the Councils were set up. A chronology of specific comments by NMFS and other interested players follows:

9/1/76: The $50 limit on reimbursement for actual expenses (5 USC 5702 and NOAA Travel Handbook) does not apply to voting members of the Council nor to the ASMFC representative "since they are not federal employees". However, it is within "the discretion of the Agency" to apply a reasonable limit to actual expenses that will be reimbursed. (NOAA General Counsel Memorandum)

12/14/76: Section 302(d) of the Act excludes the option of paying per diem in lieu of actual subsistence to voting members. NOAA Travel Regulations preclude inclusion of Federally employed Council members in the group specified in the Act as entitled to actual expenses. (R. Shoning Memorandum to Regional Directors)

Comment: This memo seems to say that NOAA Travel Regulations supersede 302(d) of the Act, which says the Regional Director (as a voting member) shall be reimbursed for actual expenses.

7/5/77: *Final Regulations.*—"Guidance" for Councils, 50 CFR 601.23(f)(2), authorized voting members and the ASMFC representative to be reimbursed for actual expenses. This Section also authorized actual expenses for invited experts, consultants and Council staff. The Council Chairman or the Executive Director were authorized to approve such expenses. Section (3) defined actual expenses as being those "within the limit established by the NOAA Travel Handbook."

1/3/79: It is clear that during its deliberations Congress differentiated between "actual expenses" and those expenses allowable under 5 USC 5702 and 5703 and consciously selected those who would be entitled to the former (actual) and those who would be entitled to the latter (5 USC). (Note: 5702 covers per diem allowances for Federal employees on official travel. It sets a maximum daily rate that is currently, December 1981, $50.00. 5703 covers per diem, travel and transportation of experts and consultants and of individuals serving the U.S. Government without pay. This section allows either per diem *or* actual and necessary expenses not to exceed an amount named in the travel authorization. That amount may not currently exceed $75.00 per day. NOAA Travel Regulations are established pursuant to these two sections of the law.)

The results are as follows:

1. Voting members and the ASMFC representative, SSC and Advisory Panel Members are entitled to "actual travel expenses" but are not entitled to per diem. "There is no statutory limit on the amount of reimbursement."
2. Council staff and "all other Federal employees" engaged in Council related activities are entitled to travel expenses under 5 USC 5702 or 5703 as appropriate in accordance with regulations promulgated thereunder.
3. The Regional Director and Federal employees serving on SSC or Advisory Panels have a dual entitlement.

These results are not dependent on Federal or non-Federal status of Council officials but are dictated by Sections 302(d) and (f) of the Act in light of its legislative history.

At present there is no control over excessive expenses which might be incurred by some individuals. All in all, it would seem preferable for the Councils to limit themselves. (Jay Johnson Memorandum to Meibohm/NMFS Washington)

Comment: Mr. Johnson's perception proved correct when Congress subsequently amended the Act to include other non-voting members of Councils (in addition to the ASMFC member) as those who may be reimbursed for actual expenses. Two conclusions are possible regarding this change in the law: (1) Congress merely wanted to make it clear that Councils were authorized to pay travel costs for employees of Federal agencies such as Coast Guard, Fish and Wildlife and the Department of State, or (2) Congress wanted to add employees of Federal agencies, in their capacities as Council members, to a group already defined in the Act as being entitled to actual expenses in a sense different from that contained in the Federal NOAA Travel Regulations.

Although all the Federal agencies paid their own employees' expenses from the beginning, it is clear in the Act that such expenses may be paid by the Council. Further, the Federal non-voting members of the Councils were already eligible to be reimbursed for "actual expenses" as defined in NOAA Travel Regulations. It is hard, therefore, to avoid the conclusion that Congress intended to accomplish both (1) and (2) above.

3/14/79: NOAA has cleared the following travel allowance policy which is effective today:

1. Voting members, ASMFC, SSC and Advisors are entitled to actual travel expenses but not entitled to per diem. There is no statutory limit on the amount of reimbursement.
2. Council staff and all other Federal employees are entitled to travel expenses in accordance with regulations under 5 USC 5702 and 5703, i.e., either standard per diem of $35 or designated high geographical rate, or with prior approval, actual subsistence not to exceed $50 per day.
3. In cases where voting members, ASMFC representative, SSC and Advisors will exceed the $50 government maximum, the Council Chairman shall determine in advance a reasonable maximum limit of actual expenses. If the government maximum is exceeded without a predetermined level being set by the Chairman, then the Chairman shall approve the travel voucher prior to payment. The Council Chairman may redelegate approval authority to the Executive Director. (Terry Leitzell Memorandum to Regional Directors and Council Chairman)

4/18/79: Given the distinction drawn between 5 USC 5703 reimbursement and "actual expenses" in Senate Bill 961, the subsequent dropping of the reference to 5703 in the final legislation, and the precise delineation of the individuals who would be entitled to "actual expenses," I can only conclude that "actual expenses" means something different under the FCMA than it does under Title 5.

It has been suggested that Congress may have dropped the reference to 5 USC 5703 from the final version of the legislation because it was obvious and unnecessary. This interpretation would render the "actual expenses" language of the FCMA superfluous since actual expenses could be authorized under the GSA regulations which implement 5 USC 5702 and 5703. (Jay Johnson Memorandum to Counsel to the D.O.C. Inspector General)

4/18/79: The FCMA does not entitle Council staff to actual expense reimbursement. We have one legal opinion that Council staff are not Federal employees—and at least a half dozen legal opinions based on other statutory definitions which conclude that Council staff are Federal employees for various purposes.

For travel expenses a much broader definition of Federal employee is applicable. Title 5 USC 5701 says one only need be employed "in or under an (Executive) agency". (Terry Leitzell Letter to Pacific Fishery Management Council)

Comment: The Act does not say anything about what staff are entitled to in the way of travel reimbursement. This letter, however, seems inconsistent with 50 CFR 601.23(f)(2) (drafted and promulgated by the D.O.C. at 44 FR 34456) which states that Councils may pay the transportation and expenses, on an actual expense basis, of invited experts, consultants and Council staff. It is true that the next Section (3) defines actual expenses in terms of NOAA Travel Regulations, but it is also true that no distinction is made in this Section between Council members and staff.

9/28/79: A number of meetings have been convened to discuss the contents of the Council Handbook. One of the proposed changes is that the subsistence rate be the same for all non-Federal persons who travel at Council expense. (Terry Leitzell Letter to South Atlantic Council)

10/80: Section 302(d) of the FCMA precludes the option of paying per diem to voting Council members, ASMFC representative, SSC members and advisors. These persons are entitled to reimbursement for actual expenses in the following amounts:—reasonable daily lodging costs plus up to $26.00 per day for meals.

Council staff, plan development teams and all others: NOAA Travel Handbook levels of $75.00 maximum for the actual expenses, $50.00 per diem, etc. (Revised FCMA Operations Handbook, Part II, E.4.)

Comment: This revision again distinguishes between Council staff on the one hand and voting members, SSC and advisors on the other. Although the Handbook refers to "reasonable subsistence limits in line with Federal limits" for voting Council members, it does not mention the $75.00 maximum; and it does not set a maximum on "reasonable daily lodging costs" for such members. As $75.00 minus $26.00 (for food) leaves $49.00, it would have been easy to say so had the intent been to limit that category of travelers to $75.00 per day in total.

11/4/80: The Council Chairman may approve actual subsistence not to exceed $75.00 per day for Council staff members on a case-by-case basis. A memo for the record should be prepared to justify exceeding the per diem rate of $50.00 or the specified subsistence rate for "designated high rate geographical areas". This authority may be redelegated to the Executive Director. (Robert K. Crowell Memorandum to Mid-Atlantic Council)

8/25/81: The D.O.C. budget office has suggested and the Acting Assistant Administrator has directed that the following provisions be inserted in Council grants for fiscal year 1982:

Reimbursement for travel expenses of Council members and members of SSC and Advisory Panels are administratively limited to amounts provided for similar travel by Federal employees under 5 USC 5702 and implementing regulations of the G.S.A. Current rates are in the NOAA Travel Handbook. Others traveling at Council expense, including Council employees, are limited to the same rates by law. (Jay Johnson Memorandum to Regional Offices NMFS)

Comment: D.O.C. suggested, Bill Gordon directed. The citation is even in error as 5702 refers only to per diem and only to Government employees.

9/2/81: The letter from Jay S. Johnson of the NOAA Office of General Counsel in effect establishes a mandatory policy for all FMC's to abide by the Standard Government Travel Regulations in all cases, meaning Council employees, Council members, consultants and members of the various S & S Committees. Your fiscal year 1982 administrative grant will include a definitized statement to this effect. I will be furnishing you a copy of the Standard Government Travel Regulations as they are set forth in the NOAA Travel Handbook. (Robert Cannon, NMFS Region, Letter to New England FMC)

9/81: Special Condition #9: Consistent with the recent ruling of the Office of General Counsel, all travels costs and reimbursements will be based on Standard Government Travel Regulations. (Fiscal year 1982 Cooperative Agreement for Administrative Support for the NEFMC)

Comment: It isn't clear what "ruling" of NOAA/GC is referred to. I signed the grant document with this provision in it after discussion with the Executive Committee. All Councils signed, although several attached statements of protest.

10/1/81: 1. All provisions of 5 USC 5702 apply to Councils, including per diem, high rate geographical areas, and case-by-case approvals of daily rates not to exceed $75.00 per day. Rates are contained in the NOAA Travel Handbook.

2. NMFS has requested that NOAA delegated approval authority for actual expenses to the Assistant Administrator for Fisheries. NMFS intends to redelegate this authority to the Regional Director or Council Chairmen.

3. Current maximum daily rate established by G.S.A. is $75.00. There is no situation where this maximum may be exceeded. Requests for actual expenses in excess of the $50.00 per diem or the high rate geographical area amount must be submitted to Commerce, through NMFS, for advance approval.

4. It was intended that the Councils adhere to the regulations governing the travel of Federal employees. (R. K. Crowell Memorandum to South East Region NMFS)

11/5/81: The legislative history of the FCMA indicates that HR 200 made specific reference to the travel expense provisions of 5 USC 5703 while the Senate version contained language similar to that of the final version. The legislative history is silent on why this was done and whether Congress intended to provide unlimited reimbursement of actual expenses.

We think it is significant that 16 USC 1852(d) [Section 302(d) of the Act] and 16 USC 1852(f)(7)(D) [Section 302(f)(7)(D) of the Act] still contain the term "actual expenses" which has a special meaning within the context of the law and regulations concerning travel at government expense. Within the context of official travel, "actual expenses" is understood to have a maximum dollar limitation and is used to allow reimbursement of expenses as opposed to providing per diem.

We think Congress intended actual expenses as it is understood under the travel statute and regulations. A literal interpretation would allow unlimited expenses.

It is our opinion that 5 USC 5702 and the GSA Regulations apply to the Councils, SSC's and Advisory Panels. (DOC General Counsel Letter to Mid-Atlantic Fishery Management Council)

11/16/81: Authority is redelegated to Regional Directors to approve actual expense travel not to exceed $75.00 per day for:

1. Council Members, SSC and Advisors
2. Council Administrative Staff
3. NMFS Personnel Attending Council, SSC or Advisory Panel Meetings.

All cases must be individually approved in accordance with the NOAA Travel Handbook, Chapter 1, Part 8.

This authority may not be redelegated.

Councils are advised to forward all actual expense requests to the appropriate Regional Office for processing. (William Gordon Memorandum to NMFS Regional Directors)

Comment: There are several noteworthy points regarding this memorandum: (1) It again treats staff in the same manner as Council members, as did the final regulations of July 5, 1977. (2) It treats NMFS employees involved in Council activities the same as Council and staff. Very helpful. (3) It requires all travel authorizations for Council and staff to be approved by the Regional Director and does not permit him to redelegate that approval authority. (4) Most importantly Section 1-1.4(c)(4) of the NOAA Travel Regulations (referred to in Chapter 1 Part 8) specifies that travel of persons other than Federal employees may be approved only by designated officials, among whom the Regional Directors are not listed.

So, the memorandum seems to be a continuation of the confusion and internal inconsistency displayed by NMFS from the beginning regarding Council travel.

11/24/81: I understand the November 16 memo to mean the Regional Director may authorize actual expenses for Council related travel up to $75.00 per day for travel that would normally be under per diem rules. No clearance required from NMFS for Council, SSC or Advisors to travel on actual expenses to locations already eligible for actual expenses, i.e., high rate geographic areas. (Letter from Western Pacific FMC to NMFS Washington)

Comment: This ignores entirely the provisions of the Act and the several earlier NOAA/NMFS determinations that voting Council members are precluded form receiving per diem. It also implies a willingness of the Western Pacific Council to accept that the Regional Director has authorization power over Council travel.

12/1/81: Your interpretation is correct. (Letter from Jack Falls, NMFS, to Western Pacific FMC)

Comment: Some people in NMFS are clearly trying to make things easy for the Councils and to allow Councils, including staff, to travel on actual expenses. This may solve the Western Pacific Council's problem very nicely. In our own case, all the places we normally meet are in Essex County, which is not a high rate geographical area. We, therefore, would be left in the position of needing the Regional Director's authorization for virtually every Council and Committee meeting we might wish to have.

12/1/81: G.S.A. reports to Congress that 64 new localities are added to the list of high rate geographical areas. The report notes that the statutory $50.00 maximum for per diem does not adequately compensate Government travelers and that the $75.00 maximum for "actual expenses" in the high rate geographical areas is not adequate in some areas where costs range from $83.55 to $141.35 per day. The per diem rate and the $75.00 maximum for subsistence can only be changed by legislation.

On the other hand, travel by privately owned vehicles (P.O.V.) costs less than the 22.5 cents per mile presently paid Federal travelers and that rate will be reduced to 20 cents per mile. (46 Federal Register 58315)

Comment: (1) As mentioned above, our meetings at the King's Grant are not in a high rate geographical area. This still leaves us subject to NMFS prior authorization for travel on a case-by-case basis.

(2) We have stayed at 20 cents per mile all along. We did not raise that rate when the Feds went to 22.5 cents in October 1980.

12/2/81: We raised the issue of travel reimbursement with Bill Gordon at the hearings on September 24. After extensive discussion it became apparent that current limitations result from a NMFS interpretation of Comptroller General decisions regarding the level of funding for other Federal advisory panels and commissions. This is an issue we intend to clarify during the course of consideration of H.R. 5002. (Breaux and Forsythe Letter to New England FMC)

Comment: I don't know what this means. There seems to be some confusion between compensation of Council members and reimbursement for travel expenses. NACOA was paying its members $100 per day, although that has been changed and MAFAC now pays the GS-18 rate (same as Council). The House Bill to amend the Act would reduce Council compensation to $100 per day. But this has nothing to do with travel reimbursement.

Where does this all leave us? Bob Cannon has suggested that we simply pay for all the rooms directly at the King's Grant and have each Council member voucher only meals, transportation and other related expenses (with our existing limitation on meals). This would seem to be a way to resolve our problem for at least the foreseeable future.

The other approach is to simply continue as we have in the past, citing the NOAA/NMFS Travel Policy of 3/14/79, which gave Council Chairmen power to determine a reasonable maximum limit for actual expenses, even if that limit exceeds the Federal maximum, and permission to redelegate that authority to the Executive Director. (That delegation of authority to the Chairman and the Executive Director has never been explicitly revoked.)

It is not clear what may happen if we follow the latter course. The Region seems very anxious that we should not. They are fearful, I believe, that they might be instructed to either withhold our next grant or reduce it by the amount by which our voucher reimbursements have exceeded $50.00 per day on a cumulative basis.

The basic issues involved are two: (1) Can we continue to pay actual expenses for members and staff at the King's Grant and similar places? I think the answer is yes—by one method or another. (2) Can we do so without explicitly (or effectively) acknowledging that we are subject to NMFS control over our travel and reimbursement activities—no matter how benign, benevolent or inoffensive that control may be? I don't know the answer to this one for certain, although I think it may ultimately be the more important of the two questions.

Please give me your instructions.

The Chairman. Thank you very much.

Mr. Kami.

Mr. Kami. Mr. Chairman, members of the committee:

I am Harry Kami, a vice chairman of the Western Pacific Fishery Management Council and a chief of the Division of Aquatic and Wildlife Resources, Territory of Guam. We appreciate the opportunity to express our support of the Magnuson Fishery Conservation and Management Act and the continuing effort by your committee to make the regional fishery councils more effective in meeting our responsibilities under the Magnuson Fishery Conservation and Management Act.

We have submitted formal testimony on the draft Senate bill under consideration by your committee. We strongly support the reauthorization of the act. Briefly, the council would like to present the following comments on the proposed amendments to the act for your consideration.

The inclusion of the Commonwealth of the Northern Mariana Islands as a voting member of the Western Pacific Fishery Management Council and inclusion of the U.S. possessions in the Pacific to our jurisdiction is strongly supported. These commitments by the U.S. Government are long overdue and we urge adoption of the amendments.

We strongly support the proposed clarification of the responsibilities between the regional councils and the Secretary of Commerce in fishery plant preparation, review and approval. These amendments are needed to promote timely responses from the Secretary. The proposed amendments would provide the regional councils the authority to determine which of the fisheries are in need of management.

We are concerned about the discretionary authority granted to the Secretary of Commerce to disapprove a council's decision for need of a management plan. Our council agrees that our fisheries may not need Federal regulations and we certainly do not intend to waste time and scarce tax money in developing and implementing fisheries management plans the cost for which may exceed the expected benefits. However, some preliminary studies may be required to reach that decision. We are in agreement with amendments which would promote full domestic utilization of fishery resources.

In addition to the comments that have just been provided, the Western Pacific Fishery Council want to bring out—bring to your attention the characteristics of our region. The islands within our council's area of authority are separated by millions of square miles of Pacific Ocean. The U.S. fishery conservation zone of the Western Pacific Council encompasses over 1.5 million square miles.

The council has prepared plans to manage the fisheries of the western Pacific, the precious coral fishery of the main island of Hawaii, and the spiny lobster fishery of the northwestern Hawaiian Islands. We are also preparing assessments of the bottom fish resources.

Whereas the tuna offers the greatest potential for fisheries development in the western Pacific region, we are excluded from the management authority of these councils. At present the tuna resources in the region are harvested predominantly by foreign fishing vessels.

In conclusion, Mr. Chairman, we in the western Pacific are optimistic about the future of the Magnuson Fishery and Conservation

Management Act and concur with the purpose and intent of the Senate bill before your committee to reassure the management of our Nation's fishery resources and the suggested changes, and urge your support.

Again, I would like to thank you for this opportunity to testify before this committee.

[The statement follows:]

STATEMENT OF HARRY T. KAMI, VICE CHAIRMAN, WESTERN PACIFIC FISHERY MANAGEMENT COUNCIL

Mr. Chairman and members of the committee: I am Harry T. Kami, vice chairman of the Western Pacific Fishery Management Council, and chief of the division of aquatic resources, territory of Guam. With me, is Mr. Henry Sakuda, fisheries director of the State of Hawaii and a member of this council. It is my honor and pleasure to appear before you and testify on the proposed reauthorization of and amendments to the Magnuson Fishery Conservation and Management Act. We greatly appreciate the continuing effort by this committee and your colleagues in the House of Representatives to improve the Magnuson Act so councils and the Secretary of Commerce can be effective partners in carrying out the Magnuson Act.

Our council has been involved with our counterparts over the past year in developing consensus positions on necessary amendments. We believe that the draft before you incorporates most of the highest priority recommendations we have made in testimony to the House and in letters to Senate and House sponsors of S. 1668 and H.R. 5002 respectively. Copies of our testimony and letters are attached to my statement for the record.[1] I do not propose to repeat those statements, but would like to focus on staff working draft No. 2, and especially on those items we believe most important.

First, we strongly support section 7, which would add the commonwealth of the northern Mariana Islands to our council and would give our council jurisdiction over all FCZ waters in the central and Western Pacific. We believe this amendment is long overdue and urge its adoption.

Second, we strongly support the thrust of the proposals to revise sections 302, 303, 304 and 305 of the Magnuson Act. These changes are needed to clarify the responsibilities of the council and the Secretary and to facilitate responsive and timely management under the act. However, we have some reservations about section 9 before you. We believe councils should determine the fisheries in need of management, as you propose. We agree not all fisheries will need management plans at this time, and we do not intend to abuse our authority by pursuing unnecessary plans. We therefore believe it is unnecessary to have the proposed secretarial "approval" authority in section 9(b). Also, we would emphasize that determining the need for a management plan can be very difficult, especially for new fisheries or for fisheries for which there are few data. We hope the committee will consider including, either in an amendment or in the committee report on this bill, language indicating its expectation that the Secretary will support and assist the council in making such determinations. That is, councils may need funds to contract for or carry out studies to determine the need for a plan, and the Secretary should be committed to providing that support.

With respect to plan approval, we agree that a time limit is critical, and 60 days is probably sufficient time for secretarial action. A plan is not suddenly thrust upon the Secretary with no warning. Councils develop many draft plans, hold hearings, and encourage review by all parties, including the national marine fisheries service, before submitting a plan. Inclusion of draft regulations in the plan should make it easier to act in the 60-day limit, as would the requirement for the Secretary to publish a notice of availability and draft regulations in the Federal Register as soon as possible after a proposed plan is received from a council. Exemption from time limits of other laws will also help.

We support the proposed amendment to exempt the council and its subsidiary organizations from the Federal Advisory Committee Act, but urge reconsideration of two points. First, while we have no objection to NMFS filing a notice of a meeting in the Federal Register, this should not be a general requirement imposed on the councils. Public notice by the council through newspapers and other media should be sufficient. Second, we think it's unnecessary to require secretarial approval to close a portion of a meeting to discuss the items listed in subsection (k)(7) of the proposed amendment. It should be sufficient merely to notify the Secretary in advance that a portion of the meeting will be closed for one or more of those specific reasons.

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[1] The material referred to has been retained in the committee files.

We support the authorization limits in section 24. The proposed cuts in the Administration's proposed fiscal year 1983 budget would effectively reduce the councils to passive observers rather than active management decision makers. The responsibilities of councils are continuing, and full funding is critical, especially in the central and western pacific.

The council supports the concept of your proposed amendment to authorize the Secretary to establish a data collection program for determining the need for a plan or preparing a plan. We would urge, however, that this not be limited to biological data. Most management and development issues have economic and social as well as biological aspects, and economic and social data may be equally badly needed.

This summarizes our positions on the major issues. On other proposed amendments in staff working draft No. 2, we have the following comments:

1. The Council has not addressed the allocations language in section 3; however, it appears reasonable.
2. Section 4 should require that councils be sent summaries of applications if copies of applications for foreign fishing permits are not sent to the council.
3. We support the concept of section 5, which would allow foreign recreational fishing vessels to operate in the FCZ and state waters even if no GIFA is in effect with the nation from which the vessel originates.
4. We agree with section 6, under which the national standards guidelines would not require mandatory compliance.
5. We recommend deleting two sentences (page 7) beginning on line 12 with the word "if" and ending line 18 with the word "Question," in section 8. We oppose the provision for removal of a council member "for cause". We support the proposal to require announcement of council appointments 45 days ahead of the effective date of membership.
6. We support the provision in section 10 requiring federal agencies to respond to councils' comments in 45 days.
7. We support the concept of a data collection program (new subsection (f) section (14). However, we recommend the councils be authorized to collect additional information which would be beneficial for purposes of determining whether a fishery management plan is needed for a fishery. We recommend the secretary authorize the expenditure of funds to obtain the information specified by the council.
8. Section 15 "a(1)", "action by the secretary . . . ." We recommend deleting (page 15, line 15) the first sentance through the word "council". Sentence should begin with "the secretary". "a(2)" (page 16, line 4) delete "as promptly as possible."
9. The language in section 16 goes beyond the approach of S. 1668 with respect to emergency action authority of the secretary and the role of the councils. We supported S. 1668 but would urge further review of the new language prior to its enactment.
10. We oppose subsection 21(b) of the proposed amendments. We believe semiannual enforcement reports as would have been required under S. 1668 are preferable for highlighting achievements and problems in enforcing the Magnuson Act. The enforcement report should be strengthened rather than dropped.
11. We support the foreign fishing observer provisions in section 22.

We would like also to express support for certain provisions not included in staff working draft #2 but discussed in other proposed amendments:

1. The provision in S. 1668 requiring councils to establish confidentiality of statistics procedures would assure councils that if they are given data, they would not have to release them under a freedom of information request. We believe such assurance may be necessary to maintain the confidence of the fishing industry.
2. Both S. 1668 and H.R. 5002 included authority for councils to determine when and where to hold hearings. We support this provision.
3. Both S. 1668 and H.R. 5002 would clearly authorize councils to include information in their plans on factors impeding full domestic utilization of the fishery and to make recommendations for actions to remove those impediments. We believe this is necessary to assure that councils can expend funds to collect and analyze these information.

In closing, I would like to express the appreciation of the Western Pacific Council for your strong support of the regional councils. While progress may not have been as fast as many had originally hoped. We have taken large steps toward effective conservation and management of fisheries in the FCZ. In addition, the regional councils provide a critical and vital avenue for State and Federal agencies in partnership with industry to develop and manage our Nation's fisheries. We look forward to your continued support.

I will try to answer any questions you may have.

Thank you again for the opportunity to testify.

The CHAIRMAN. Thank you, sir.

Mr. Branson.

Mr. BRANSON. Mr. Chairman, members of the committee; my name is Jim Branson, I am the executive director for the North Pacific Fishery Management Council. I appreciate the opportunity to testify before you today. I have submitted written comments.

We agree very strongly with the general thrust of the staff amendments. We think they are quite good. We think they can be strengthened in some areas, and my detailed testimony addresses those specific areas. I would like to touch on some of them at this time, however.

The general thrust toward speeding the plan amendment process is one that the council has been active in since the inception of the FCMA. We think that this draft, the proposed amendments, go a long way toward doing that.

The ability for the council to determine whether or not a fisheries management plan is needed and the procedure that is set up for it in the draft we think is good. It responds to the public. It responds to the need for determining whether or not a plan is necessary, and in many cases they will not be necessary.

I would not like to see it made mandatory as a determination for every fishery resource in a council's zone of jurisdiction, however, because that would entail a great deal of paperwork, much of it unnecessary. But those plans that need to be addressed I think are really quite obvious.

The proposal to raise the fees to fishermen for a limited entry system that would allow financing of a buyback program we think is sound. We would like to suggest that the legislation should also allow the Department of Commerce to contract, if necessary, with a State agency or other agency for the administration of a limited entry system, and to allow that agency to actually collect the fees to finance the program.

While the council, the North Pacific Council, has not decided if a limited entry system is necessary, there is a very good possibility that they may do so in the case of halibut. The State of Alaska already has an existing administrative system for limited entry that could be utilized in any system that applied to Federal fishery of the State of Alaska.

I believe there is a problem with the proposal for data collection for fishery management plans or to determine if there is a need for a fishery management plan in the proposed amendment, in that it is restricted now to strictly biological information. The councils are required, for a number of reasons, to include other types of data in their plans and in their other work, economic and social particularly, and while we understand the reluctance of the processors to divulge that kind of information we simply are required by law to include it in fishery management plans, in analyses for the Regulatory Reform Act and other Government mandates.

We do believe that information should be protected as to its confidentiality. The council itself seldom has any need for raw data, and existing legislation in the Federal Government does protect that type of information. I see no problem with the Department of Commerce having the authority to collect it.

There are several points that apply only to the North Pacific Council that I would like to mention very briefly. But before that I would like to say that the observer program is extremely important off Alaska. We consider 30 to 40 percent coverage of the foreign fleet a very minimum requirement for the technical analysis that analysis that we need for the fishery management plans and for continuing management.

The CHAIRMAN. Mr. Branson, I am going to have to ask you to abbreviate and conclude. We have 1½ of witnesses to go after this now. I just have to keep right on time.

Mr. BRANSON. Thank you, Mr. Chairman.

I think the thrust of the material I would like to address is in my written statement. I would like to say one word about the proposed administration budget for National Marine Fisheries Service for 1983. While I think it is true that there is some fat that can be cut from any bureau's budget, this sounds to me like a case of terminal malnutrition. Basically, they cannot operate at that amount.

Thank you, Mr. Chairman.

[The statement follows:]

STATEMENT OF JIM H. BRANSON, EXECUTIVE DIRECTOR, NORTH PACIFIC FISHERY MANAGEMENT COUNCIL

Thank you, Mr. Chairman and members of the Committee, for this opportunity to testify on amendments proposed for the Magnuson Fishery Conservation and Management Act, the reauthorization of that Act, and other matters pertaining to fisheries conservation of that Act, and other matters pertaining to fisheries conservation as it relates to the Act.

The North Pacific Fishery Management Council continues to champion changes in the Act that will speed the plan and regulatory process through the labyrinth of requirements that now slow them to a lethargic crawl. The process generally has been unable to keep up with the course of events in the industry and the resource. That must change if we are to have credible management. We can increase reliance on existing management machinery, be it state, Federal, or international, and we can redesign the machinery so that Federal regulatory process as envisioned in the Act works more smoothly. Amendments are necessary to accomplish either of those goals.

I would like to begin my testimony by commenting on the working draft prepared by the Committee staff, then commenting on some of the proposals in the comparable House bill, HR 5002, and then briefly outline the Council's priority areas for fisheries funding.

SEC. 3. Section 201(e) would be amended to allow the Secretary of State, in cooperation with the Secretary of Commerce, to reduce allocations to foreign nations in mid-year for cause, and outlines how those causes shall be determined. The North Pacific Council has advocated this kind of action and power for the Secretary of State for some time. It is a very direct and effective response to repeated serious violations by a nation's fishermen. It is a power that should not be used capriciously, however, but should be a response to a definite trend or pattern of violations, and only violations. Other problems, such as failures to live up to agreements in joint ventures, do not need a response in mid allocation year. It is more appropriate to weigh them in relation to next year's allocations.

SEC. 4. Section 204(b)(4)(B) would make Council review of foreign permit applications optional rather than mandatory. I believe the North Pacific Council will continue to ask that permit applications be sent to them for review and they will continue to comment on them. They are a proven vehicle for reviewing violation records and the proper method for putting joint venture operations, allocations, and procedures in a public forum for comment and discussions. My Council probably reviews more permit applications than any of the others, but we have reduced the paperwork to a minimum and the Council actually spends its valuable time only on those issues critical to policy and management.

SEC. 5. *Foreign Recreational Fishing.* The Council would like to see foreign recreational fishing permitted under regulations developed by the appropriate state and the Secretary of Commerce. They do not believe it should be tied only to fishing tournaments, but it should be restricted to foreign vessels not operated for hire or profit. This is an important issue for U.S. citizens in the Pacific Northwest who frequently transit or fish in British Columbia, as well as for those Canadians who fish in U.S. waters in southeastern Alaska.

The Council would like more lead time in the announcement of new Council appointments. Cliffhangers like we had last year are not very productive.

The revision of Section 302 (SEC. 9), which allows the Council to determine whether a plan is necessary for a fishery within its area, is most welcome, as are the steps through which that determination will be made. Not every fishery will need a management plan. For some it will be because there is simply no need for management, and for others because management is already adequate through existing machinery, whether it be by the state or by an international body such as the Pacific Halibut Commission. As long as that management conforms with the Act and other appropriate U.S. law, we should not duplicate or disrupt it. The proposed amendment provides for justification by the Council, review and comment by the public, and requires the Secretary to detail his objectives if he disagrees with the Council's conclusions.

Exempting Council activity from the Federal Advisory Committee Act (SEC. 11) and substituting similar but more timely requirements for Council action will improve Council functioning, enabling us to respond more efficiently to our management responsibilities. The proposed amendment will still ensure adequate notice to the public and complete participation in all Council activities by all interested persons.

The amendment to Section 303 (SEC. 12), which improves the language providing for limited access systems and allows charging fees to fund vessel "buy-back" programs or their equivalents, is very timely. I would recommend one addition to that section which would allow the administration of a limited access system and collection of fees to be contracted to a state by the Department of Commerce and allow the contractor to retain fees to operate the program.

We are currently studying limited access systems for the halibut fishery off Alaska. Most of the industry has asked for some sort of control and it is a fishery that lends itself to that type of management. We expect that some system for limiting access will be in place by 1983, at least by 1984. The State of Alaska has a system in place for limited entry; if it is possible to contract with them to administer whatever system is developed for halibut, it would be a great saving in both manpower and expense to the Federal government. The Department of Commerce would not have to gear up for an additional, complex administrative and recordkeeping function.

The amendment of Section 303(c) (SEC. 13), which requires draft regulations to be submitted with a fishery management plan for Secretarial review, is a good one. While we have attempted to submit regulations with a plan in the past, we have not always done so. We have been remiss in that respect and we know that timely development of regulations will speed the entire process.

I would recommend that we go a step further in this area and when SEC. 16 Section 305(a) is considered, that the Secretary of Commerce be directed to publish a Notice of Proposed Rulemaking when he receives an FMP for review, using the draft regulations submitted with the plan. this would considerably enhance the entire review and implementation process. By the time the Secretarial review was finished, the comment period for Proposed Rulemaking would be over. Comments could be considered for both the plan and the regulations and if the plan has been accepted by the Secretary, Final Rulemaking can be accomplished within a short time. That would eliminate the current time consumering step of Proposed Rulemaking, which now follows approval of the plan by the Secretary.

As the amendment is proposed in the Staff draft, it appears that publishing a Notice of Availability of a plan and accepting comments for 30 days while the plan is being reviewed is somewhat redundant. Any FMP has gone through an extensive public review and comment process, sometimes lasting for months, before it ever gets to the Secretary. To go through the same thing again does not appear to be really necessary. This would be particularly true if a Notice of Proposed Rulemaking and the opportunity to comment on proposed regulations is concurrent with place review.

SEC. 14. Section 303(e) allows the Council to design and the Secretary to implement data collection programs to determine if a plan is necessary or to develop a plan which has been determined necessary. That is a very desirable amendment, but it should, in fact must, include social and economic as well as biological data. Not only the MFCMA, but other Federal acts such as the Regulatory Reform Act and the National Environmental Policy Act require social and economic analysis of Council actions. Any data collection program must collect social and economic data as well as biological data. The confidentiality of that data must be protected, of course, and it would be by existing Federal legislation. The North Pacific Council seldom needs raw data or data from single operations in their plan development process. In those instances where they do, they have asked for (and usually received) voluntary information. The fishing industry is a highly competitive business and its participants are understandably reluctant to reveal details of their operations. Yet it is an industry based on a publicly-owned resource and to be properly managed, some of that information simply must be made available to the management agencies.

SEC. 16. Section 305(e), extending the length of time that an emergency regulation can be in place and further defining how those regulations are developed, is very welcome. Emergencies are always going to occur in this business and the plan amendment process is generally too slow to cope with them. The situation will improve as we develop framework plans and as we learn more about the resource, but emergency regulation power for the Secretary is necessary for the foreseeable future. The two 45-day periods now provided by the Act are not adequate. I endorse the language in your draft.

The problem of "enclaves" as addressed by SEC. 18. Section 306(a) is a real one in Alaska. The proposed amendment is adequate for those FCZ areas completely surrounded by state waters. There are other areas that also cause problems, usually deep inlets or entrances to archipelagos where the FCZ may intrude well into areas that have traditionally been managed as inshore fishing areas. Those problems can be resolved if it is possible to define a fishery management unit (FMU) based on straighter lines, leaving those long penetrations of territorial waters to management by the adjacent state. The definition of a fishery management unit as used in any given FMP should be left to the appropriate Council.

SEC. 22. Section 201(i)(5) is very desirable. Direct payment of observer costs from the observer fund without going through appropriations acts will greatly enhance this program. Our average observer coverage off Alaska last year was only 10%. We expect it to be up to almost 35% to 40% for the rest of this year, but program expansion was greatly delayed because we had to wait for an appropriation. Since the program is totally funded by the foreigners that host the observers, it seems appropriate to keep it as a revolving fund. The Act mandates the kind of coverage required, so little further action or descretion is possible.

While on the subject of observers, I would like to note that it is almost impossible for an observer to be an enforcement agent. They can certainly monitor the conduct of a foreign fishery operation and their compliance with the regulations, but they cannot be expected to be active in enforcement. Their role as scientific observers and catch monitors is much too important to endanger or degrade by imposing additional duties that are impossible to perform.

In other areas not addressed by the draft being considered by this Committee, I would like to recommend that the Regional Director of the National Marine Fisheries Service, now an obligatory voting member of the Council, be retained as just that—a voting member. The North Pacific Council feels very strongly that the Regional Director's role is much too important to curtail his participation as an active voting member. That active, voting membership stimulates discussion, openly develops rationale for the Department of Commerce position on Council actions, and makes a commitment to action when he votes that would not be there if the Regional Director were a non-voting member.

We would like authority to hold public hearings on MFCMA matters outside of our area of authority, particularly in the state of Washington. As the Act is currently written and construed, we do not have that ability. Many of the fishermen and a great preponderance of the industry engaged in the fisheries off Alaska are based in Seattle. If we are to get full public participation in the planning process, we must have that input. The need for participation by people from those areas was recognized when three of our voting members were designated to the Council from the state of Washington and one from the state of Oregon. Allowing the Council to hold public hearings on the West Coast is simply an extension of that recognition.

The House proposal to reduce the compensation of Council members seems unnecessary. The savings would be minimal and most Council members are even now poorly paid for the amount of time they put in and for the very great amount of expertise they bring to the regional fishery management process.

FUNDING

The North Pacific Council is very concerned that adequate funding be maintained for resource surveys, data collection, and analysis. Those areas are absolutely necessary for the Council management function. While we recognize the importance of other programs in the National Marine Fisheries Service and generally endorse them, the basic areas mentioned have to be adequately funded or the whole process will collapse. Resource surveys are expensive. It takes valuable ship time and lots of it to do a proper job, and it needs the right kind of ship time. It is the Council's belief that more can be accomplished at less cost if we concentrate on chartering fishing vessels for survey work. They are much less costly and usually more efficient than all but the smaller units in the present NOAA fleet.

We must fund research commitments made by the United States in international negotiations. I refer specifically to our commitments to Japan and Canada in the International North Pacific Fisheries Convention and to research requirements arising out of our current negotiations with Canada on trans-boundary salmon problems. Those agreements can solve many of our problems and go a long way toward rehabilitating salmon resources in the North Pacific, but they will not work if we don't live up to our commitments by doing the research promised.

Salmon is still the number one fishery resource in Alaska. Funding for anadromous fish programs has been important in rebuilding and maintaining salmon as a strong and viable resource. We cannot afford to abandon those programs.

In summary, Mr. Chairman, I believe the proposed amendments are good ones. I think they can be strengthened in some areas, but with relatively little change will greatly improve the functioning of the Magnuson Fishery Conservation and Management Act. The Act is still a very sound piece of legislation. Even though we have heard many grumblings about its effectiveness since it was passed in 1976, it has accomplished a great deal. The American fishing industry is in better shape now than it was before in most areas; the foreigners have been removed from some fisheries; and the end is in sight for them in the others, except as participants in the processing and investment areas. As a Council we think we can do more and do it better. These amendments and adequate funding will go a long way toward accomplishing that. Thank you.

The CHAIRMAN. Mr. Vega.

Mr. VEGA. Thank you.

Mr. Chairman, members of the committee, my name is Héctor Vega. I am a commercial fisherman by profession and chairman of the Caribbean Fishery Management Council.

On behalf of the council and on my own behalf, thank you very much for the opportunity given to us to present our points of view and recommendations on the congressional process of providing the necessary appropriations for the Magnuson Fishery Conservation and Management Act.

It is difficult in our case to evaluate whether the proposed funding authorization for the years 1983–85 are adequate, as we do not have a breakdown of the suggested funding for councils. May we restate our opinion, though, that the National Marine Fisheries Service and the council funding should be adequate for them to discharge properly their responsibilities.

Regarding the proposed amendments to the act, we would like to offer you our comments and suggestions in those areas of more significance to the Caribbean council. Regarding section 5 of the bill, on recreational fishing, passage of the amendment would satisfy the council's 1978 request to allow foreign recreational vessels to participate in fishing tournaments.

We fully support the addition of a new subsection under section 302 of the act to make clear the authority of the councils to determine whether a fishery within its geographic area of authority requires or does not require conservation and management through a fishery management plan. However, it is our suggestion that the new subsection be reworded so as to make clear the congressional support of management plans for fisheries even if they are apparently healthy when the plan provides for the "preventive maintenance" of the fishery.

In the version of the Senate bill under consideration, the section on council-State plans for shared fisheries has been deleted. This section was in the original bill S. 1668. There is no explanation as to the reason for this action in the document that you accompanied with the new bill, which explains the differences between the staff working draft of March 17 and the Senate bill as introduced.

Our council proposed this section to the councils' chairmen and the executive directors at our 1981 meeting in Alaska. Legal counsel stated on the occasion that they had no objections to it. Thus the proposed amendment was adopted unanimously.

In referring to this proposed amendment, the Department of Commerce General Counsel, Mr. Sherman E. Unger, stated the following, among other things, in his memorandum of February 16, 1982, to you:

> S. 1668 would provide Councils with clear authority to act with constituent States to develop FMPs for fisheries within and beyond State boundaries, while not necessarily committing the states to adopt management regimes so developed.

It is our most sincere opinion that the adoption of this disposition will facilitate plan development activities of the Caribbean council. The Department of Commerce having no legal objections to it and considering that the proposed amendment was endorsed by all the councils, we would like to suggest that you reconsider this issue, taking into consideration the Caribbean council's support of the measure.

The Magnuson Act is clear in maintaining the jurisdiction or authority of the States over their respective boundaries. However, even if Federal intervention to regulate fisheries within State waters is only permitted under very——

The CHAIRMAN. I am going to have to ask you to conclude.

Mr. VEGA. OK, Mr. Chairman. Let me finish what I just—some time ago the Congress extended to the Government of Puerto Rico control over its adjacent waters from 3 nautical miles to 10.35 nautical miles. The National Marine Fisheries Service has concluded that this law includes control over the fisheries found within those waters.

After the law was enacted and the legal opinion issued, we have worked and will continue to work with the Puerto Rican government to create the appropriate climate to continue fisheries management plan development work, in close coordination with both the government of Puerto Rico and the territory of the U.S. Virgin Islands, based on the concept of "shared fisheries" to adequately protect the resources found within their waters, while keeping in mind the interest and desires of both governments.

Thank you.

[The statement follows:]

STATEMENT OF HECTOR VEGA, CHAIRMAN, CARIBBEAN FISHERY MANAGEMENT COUNCIL

My name is Héctor Vega. I am a commercial fisherman by profession and the Chairman of the Caribbean Fishery Management Council.

On behalf of the Council, and on my own behalf, thank you very much for the opportunity given to us to present our points of view and recommendations on the Congressional process of providing the necessary appropriations to carry out the Magnuson Fishery Conservation and Management Act.

Since its creation, the Caribbean Council has been operating with relatively small appropriations for administrative purposes. Annual increases have been mainly the result of inflationary costs. Our present level of spending is around $460,000 per year. Several measures have been taken by our Council to reduce expenses responsible, in line with the national policy.

As stated to the House Subcommittee on Fisheries and Wildlife Conservation and the Environment, according to the latest available fisheries statistics published by the Department of Commerce under "Fisheries of the United States, 1980", commercial landings (edible and industrial) by U.S. fishermen at ports in the 50 States were a record 6.5 billion pounds valued at $2.2 billion in 1980, up 3 percent in quantity but about equal in value compared with 1979, the previous record year.

For the third consecutive year the United States established new record landings. The percent of the total U.S. supply of commercial fishery products produced by the U.S. domestic fishery increased over the last 4 years. In 1980 domestic production of total supply was 57.1 percent and imports 42.9 percent. In 1976 the U.S. production accounted for 46.5 percent of total supply.

Commercial landings by U.S. fishermen at ports outside the 50 States and transferred in the U.S. fishery conservation zone (FCZ) onto foreign vessels (joint ventures) were an additional 255.4 million pounds valued at $102.2 million. Most of these consisted of tuna landed at canneries in Puerto Rico and groundfish transferred to foreign vessels in other areas.

We feel that the Magnuson Fishery Conservation and Management Act has been instrumental in the progress attained by the U.S. fishing industry during recent years. The Regional Fishery Management Councils' approach to fisheries management and conservation has proved to be the most practical instrument in dealing with fisheries problems and development. We feel that in order for the industry to continue its already demonstrated achievements during the past years it is absolutely necessary for you to maintain an adequate level of funding to the Councils. The Councils have already passed by the initial stages of organization and planning and are already in their most productive years. We feel that the most adequate funding under the present economic constraints must be provided to them so as to prevent any curtailment of their operations.

It is difficult in our case to evaluate whether the proposed authorization for the years 1983–85 are adequate as we do not have a breakdown of the suggested funding to Councils. May we restate our opinion, though, that Councils funding should be adequate for them to be able to discharge properly their responsibilities.

Regarding the proposed amendments to the Act, we support them but would like to offer you our comments and suggestions in those areas of more significance to the Caribbean Councils:

Regarding Section 5 of the bill, on Foreign Recreational Fishing, passage of the amendment will satisfy the Council's 1978 request to allow foreign recreational vessels to participate in fishing tournaments without a GIFA.

We fully support the addition of a new Subsection under Section 302 of the Act to make clear the authority of the Councils to determine whether a fishery within its geographical area of authority requires or does not require conservation and management through a fishery management plan. We feel, however, that appropriate wording should be incorporated into the new Section so as to make clear the Congressional intent. Allow me to explain this in more detail. Under the present circumstances, it is NMFS policy not to accept the development of fishery management plans unless a fishery is in dire need of management. Their policy in this respect is based on the concept of cost-effectiveness of the regulatory programs. In a letter to our Council, this policy is stated as follows:

"Although the Magnuson Act provides a broad mandate to manage and conserve marine fishery resources, we must ensure that our regulatory programs are justified and cost effective to comply with the Administration's policies and the Magnuson Act. Since our budget is limited, we should develop management plans for fisheries where: (1) the clearly identifiable problems cannot be solved by means other than

Federal regulations: and (2) the preferred regulatory solution can be expected to yield a better outcome than the status quo situation."

In practice, the first question asked by NMFS on an FMP is Why? If the answer is not clear in stating that the stocks, the industry, the habitat, or all three, are in a precarious situation, the plan has few possibilities of being accepted. In summary, if a critical condition of the stocks can not be documented, NMFS feels that there is no need of management.

We realize that NMFs has to accommodate their operating policies to their financial constraints. However, we feel that there should exist the proper balance and that NMFS should accept as valid, Councils recommendations to regulate a fishery to avoid its deterioration.

Thus, it is our suggestion that, if you are in agreement, the new Subsection under Section 302 of the Act be reworded so as to make clear a Congressional support of management plans for fisheries, even if they are apparently healthy, when the plan provides for the "preventive maintenance" of the fishery.

We are surprised by the fact that in the version of the Senate Bill under consideration, the Section on Council-State Plans for Shared Fisheries has been deleted. This Section was in the original Bill S. 1668. There is no explanation as to the reason for this action in the document that you accompanied with the new Bill, which explained the differences between the staff working draft of March 17 and Senate Bill, as introduced.

Our Council proposed this Section to the Councils' Chairmen and Executive Directors at their 1981 meeting in Alaska. NMFS Legal Counsel stated in the occasion that they had no objections to it. Thus, the proposed amendment was adopted unanimously.

In referring to this proposed amendment, the Department of Commerce General Counsel, Mr. Sherman E. Unger stated the following in his memorandum of February 16, 1982 to you:

S. 1668 would provide Councils with clear authority to act with constituent states to develop FMPs for fisheries within and beyond state boundaries, while not necessarily committing the states to adopt management regimes so developed (section 7). We would not oppose such an amendment, even though Councils already are developing FMPs for "shared" fisheries and cooperating in their implementation. Formal amendment to clarify this authority would have little effect, if any, upon Council operations and capabilities. It is important for the Councils and the states to work together to avoid duplication and the burden of unnecessary regulation.

It is our most sincere opinion that the adoption of this disposition will facilitate plan development activities of the Caribbean Council. The Department of Commerce having no legal objections to it and considering that the proposed amendment was endorsed by all the Councils, we do not understand your reasoning for deleting it from the Senate Bill. With due respect, we would like to suggest that you reconsider this issue taking in consideration the Caribbean Council support of the measure.

The rationale for our proposal could be explained as follows:

The Magnuson Act is clear in maintaining the jurisdiction or authority of the states over their respective boundaries. However, even if federal intervention to regulate a fisheries within state waters is only permitted under very extenuating circumstances, no reference is made to plan development for fisheries predominant in territorial waters when both the affected States and the pertinent Council are willing to develop an FMP for such a fishery, covering its entire habitat or range, if the fishery is in need of management.

Some Councils have been able to initiate plan development in situations in which it is not clear whether the fisheries are more or less predominant in territorial waters, with no apparent concern by NMFS. However, in other situations (the Caribbean Council is a clear example) NMFS position has been to oppose Council's efforts to develop management plans for fisheries which are apparently predominant in territorial waters in spite of the fact that the constituent "states" of the Council have clearly manifested their willingness that such a plan be developed.

NMFS position in this respect, added to their veto power on plan development initiatives through the "work plan" system, prevents that management plans be developed for fisheries that are in serious threat of permanent damage and, naturally, in urgent need of scientific management.

Should NMFS interpretation of the Magnuson Act in this regard be extended to other fisheries, some big fisheries, like the menhaden (around 80 percent in territorial waters) could be subject to the same policy which will have the effect of rendering this and similar fisheries ineligible for management under the Magnuson Act.

Some time ago, the Congress extended to the Government of Puerto Rico control over its adjacent waters from three nautical miles to 10.35 nautical miles. The National Marine Fisheries Service has concluded that this law includes control over the fisheries found within those waters.

After the law was enacted and the legal opinion issued, we have worked and will continue to work with the Puerto Rican Government to create the appropriate climate to continue fisheries management plan development work, in close coordination with both the Government of Puerto Rico and the Territory of the U.S. Virgin Islands, based on the concept of "shared fisheries", to adequately protect the resources found within that water column while keeping in mind the interest and desires of both Governments.

Finally, we would like to respectfully point out again to the Subcommittee that the Caribbean Fishery Management Council, because of its geographic location and its involvement and interest in Caribbean affairs, should be viewed also in the context of the interest shown in it by other small island nations who are also interested in developing a successful management strategy for their fisheries resources. In all Caribbean countries, fisheries are a very important part of their economic and social structures and future U.S. fisheries policy in the Caribbean should acknowledge this fact. We feel that the clear, unmistakable support of Council activities by the pertinent governmental agencies would be in line with the new U.S. policy regarding nations in the Caribbean Basin.

Thank you very much for the opportunity to present our views on these important issues.

The CHAIRMAN. Thank you, sir.

Mr. Bryson, representing the Mid-Atlantic.

Mr. BRYSON. Thank you very much, Mr. Chairman.

The CHAIRMAN. Pull the microphone right up close. It is hard to hear in the back of the room.

Mr. BRYSON. Thank you very much, Mr. Chairman.

My name is John Bryson, executive director, Mid-Atlantic Council. We thank you for the opportunity to present our views.

Section 3 is very good. We think it needs some strengthening in the fact in that the initial allocations are made from the TALFF, as the plan specified, and some nations do not fish that allocation at all. This amount is never reallocated among the nations who are fishing, but we do reallocate from U.S. fishermen to the foreigners to finish up that year's fishery catch. So I think we are hurting our own people when others are not taking reductions at all. That should be corrected.

Section 3 would be much better implemented if section 301(a)(1) is amended to change the national standard to the concept mentioned earlier by the Gulf Council. We have met interpretive problems with NMFS and I think the two things would correct the total problem.

We are very much opposed to submitting work plans back to NMFS again for approval to do a plan. This is essentially what section 9 would do. That procedure in the past has delayed plans up to 15 months. That is atrocious. The councils, along with their scientific and advisory panels, particularly the councils are comprised of the State directors and fishermen who are involved in deciding which fishery needs management. To have that kind of delay is inexcusable.

The councils feel that in section 10 should be able to take a little stronger role than simply commenting. We like the original language you had in the April 13 version. It was better.

Section 14, the specification of biological data collection, we think greatly reduces the council's ability to carry out their functions. We are charged with considering economic information. Now, I realize the processors do not want to supply that, but yet the same processor will come back to you when you have done a plan and tell you, you do not understand our industry. Well, we would like to understand the industry. We would like to have enough data to do an adequate plan with. As long as we have the requirements to use economic information in the regulatory impact analysis, 12291 and so forth, we do need that data. The best source is from the processor himself.

We are concerned on emergency planning action that it may be setting up some problems. It seems to us the best would be one that you have to balance between the councils and the Secretary. We have offered some suggestions here for that.

And nobody addressed the point where one council may by unanimous vote ask for emergency action or require emergency action that may affect other councils. Those councils have no chance of input. We think that that may need correcting.

On the observer coverage, we feel if it is reduced simply to scientific observation we are missing the boat on what we can do. We have the man on board or hopefully we will have a man on board, and at least he could observe the violation and advise the captain of the vessel that there is a violation occurring and call the Coast Guard.

[The statement follows:]

STATEMENT OF DAVID H. HART, CHAIRMAN, AND JOHN C. BRYSON, EXECUTIVE DIRECTOR, MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

Thank you for the opportunity to present the comments of the Council on Staff Working Draft 2, dated April 19, 1982, to authorize funds for the Magnuson Fishery Conservation and Management Act for fiscal years 1983, 1984, and 1985 to improve conservation and management of our Nation's fisheries, and for other purposes.

We believe that the proposed amendments will result in significant improvements to the Magnuson Act, but we have reservations about certain provisions of the amendments, question some provisions and suggest additional amendments.

SEC. 3. Section 201(e). The proposed amendment does not seem to indicate the withdrawal of an allocation or a portion of an allocation due to inactivity or nonfishing.

The Councils have experienced the frustration of having a reserve allocated to TALFF and distributed among foreign nations while other foreign nations' allocations remain unused. This can lead to the US fishermen being cut off from fishing (due to estimation problems and market fluctuations) while a substantial amount which is allocated to a foreign nation is not being used. Please note the amounts indicated as unused by the attached NMFS annual fishery level reports.

When we couple this with the problems associated with National Standards One, Section 301(a)(1) present interpretation, we definitely have a situation where our trying to be reasonable, in allowing foreign nations any surplus or a bycatch amount to allow taking of another species, can easily backfire through foreign manipulation to hurt the US fisherman.

In fishing year 1981 an additional 659 mt of butterfish was reallocated over the original 759 mt certified by the Council. The total take of butterfish by foreign nations was 516.4 mt.

Some very interesting facts on reallocation are found in reviewing three country's allocations and reallocations. Table I at the end of this paper demonstrates how Japan took advantage of the reallocation to direct their efforts toward butterfish and reduce the need to purchase butterfish from US processors. Please note their nine month fishery at a clean bycatch ratio of 1.0 percent to a very obviously directed effort toward butterfish and a 15.7 percent fishing year bycatch ratio.

SEC. 4. Section 204(b)(2)(C) (Line 14). This section would seem to require the Council to request each application rather than a blanket request. The conduct of foreign fishing vessels is important to our Council, therefore, we want to review their application and violation records prior to recommending action on an application.

SEC. 5. Section 201(j) (Line 4). The present use of the word "profit" would seem to keep a foreign vessel captain from charging a fee to his own nationals for participation in a U.S. tournament. I hope your intent was not this restrictive since it would, in effect, negate the intended gains. As written this section would allow only "private" foreign vessels to participate.

SEC. 6. Section 301(a)(1). As mentioned previously, we feel this section should be amended. We prefer the language contained in S. 1668 to amend this section.

SEC. 9. Section 302(h)(1). we are opposed to the provisions of Section 9 for several reasons. We believe that the Councils should have the authority to determine whether a plan is needed for a particular fishery. The Councils, working with their Scientific and Statistical Committees and Advisory Panels, are in a better position to assess the need for a plan than are employees of the Commerce Department. In addition, we believe the requirement to prepare a plan to do a plan would result in substantial needless paperwork and time delays. We were forced to deal with this problem under a Presidential Executive Order, that has fortunately been repealed. Under that Executive Order we were required to prepare work plans which had to go through the entire Commerce Department review and approval process up to the level of the Administrator of the National Oceanic and Atmospheric Administration. A delay of up to eighteen months for approval was the rule rather than the exception. The requirement would also divert staff resources from the major task of preparing and amending fishery management plans to preparing plans to do plans.

SEC. 10. Section 302(l)(1). We support the concept that the Councils may become involved in areas related to fishery management in addition to fishery management plans, but we believe that the role of the Councils should be more affirmative than merely "commenting". "Comment" implies that the Councils are constrained to respond to proposals of other organizations, whereas we believe that the Councils should be permitted to make recommendations on their own initiative, particularly where the fisheries they manage are being impacted.

SEC. 11. Section 302(k)(3). This section should provide an additional council official as an alternative to the chairman or vice chairman in the event either is unavailable.

SEC. 12. Section 306(b)(6). We assume the cost of the buy-back program would be part of the cost of issuing permits; otherwise there is a conflict with Section 304(d).

SEC. 13. Section 303(c). We support this change.

SEC. 14. Section 303(f)(1). The specification of biolgical data greatly reduces the effectiveness of the additional section.

We understand that the processors are touchy about providing operational and economic data but we must remind you as we do the processors, the MFCMA, Secretarial guidelines and Executive Order 12291 all require the use of such information. To our knowledge these data have not been misused.

The elimination of economic information will result in poor plans and, in fact, plans that may be easily and successfully challenged in the courts.

SEC. 15. Section 304(a). We believe that the phrase "As soon as possible" in amended paragraph (a)(1) should be replaced by "Within 60 days" to eliminate any interpretative conflict between whether "as soon as possible" or 60 days is the Secretary's deadline for approving or disapproving a plan. Based on experience thus far in the program, "as soon as possible" could well be in excess of 60 days.

SEC. 16. Section 305(a). This section seems to require that the Secretary publish the regulations proposed to implement a plan for public review prior to the time when the Secretary makes a decision to approve or disapprove the plan. If that is the correct interpretation of the section, we support it since it would significantly speed up the process of plan implementation. However, we believe that the section should be rewritten to clarify that intent.

We are very concerned about the provisions of paragraph (d), Emergency Actions, Section 305(a), on page 18. That paragraph sets a time limit of 180 days on emergency regulations promulgated at the request of a Council but sets no time limit on emergency regulations promulgated by the Secretary. This could result in the Secretary frustrating the objectives of approved fishery management plans since the Secretary could declare an emergency (a term which should be defined) and unilaterally impose regulations for which there is no appeal in the statue. We are also concerned that both the Councils and the Secretary could impose emergency regulations unilaterally. Ideally, either the councils or the Secretary should be able to determine whether an emergency exists and propose regulations to deal with it. Emergency regulations proposed regulations to deal with it. Emergency regulations proposed by the Secretary should be approved by the Councils involved prior to publication for public review and regulations proposed by a Council should be approved by the Secretary and other affected Councils prior to public review. The duration of the emergency regulations should continue until a more permanent solution (plan) can be effected or the cause for the emergency no longer exists.

SEC. 22. Section 201(i)(3). It would seem we can make better use of observers than this. We feel observers should advise the captain of the vessel of any continuing violations and call the Coast Guard if the problem is not promptly resolved. Refusal of the vessel's officer to allow U.S. observers use of radio facilities on a timely basis to call the Coast Guard should result in revocation of the present and denial of a future fisheries permit.

We appreciate the opportunity to present our comments on the proposed amendments to the Magnuson Act to the Committee. We will attempt to answer any questions you may have concerning our comments.

TABLE I.—FISHING YEAR 1981 ALLOCATIONS AND CATCHES (APR. 1, 1981, THROUGH MAR. 31, 1982)

[In metric tons]

Country	Species	Initial allocation	Catch Jan. 9, 1982	Butterfish bycatch (percent)	Reallocation	Catch Mar. 31, 1982	Butterfish bycatch (percent)
Spain	Butterfish	257	39.1	1.6	605	147.0	1.8
	Loligo	11,780	2,472.7		12,336	8,259.6	
	Illex	8,920	6,700.0		8,920	7,571.6	
Italy	Butterfish	71	46.3	2.8	150	66.9	2.0
	Loligo	5,692	1,634.1		6,950	3,264.6	
	Illex	6,170	2,660.1		6,170	3,213.8	
Japan	Butterfish	199	82.9	1.0	310	302.5	15.7
	Loligo	9,728	820.1		11,869	1,930.0	
	Illex	5,600	4,117.7		5,600	4,195.5	

REPORT BY NATIONAL MARINE FISHERIES SERVICE, NORTHEAST REGIONAL INFORMATION SYSTEM (NEREIS)

Report title: "Catch Reported by Designated Foreign Officials"
Report number: NEREIS RPT 002
Report date: 4/9/1982
Period covered: 1/1/1982 thru 3/31/1982
Prepared for: Distribution lists: A, C, E, F, and I
Prepared by: Analytical Services Branch, P.O. Box 1109, Gloucester, MA 01930. Contact: J. Terrill.

NOTES:

1. This report does not constitute a publication.
2. All data herein are provisional.
3. Catch and allocation figures are in metric tons.
4. Allocations for Silver Hake, Red Hake, River Herring, other finfish, and shark are for 1/1/82 thru 12/31/82.
5. Allocations for Mackerel, Butterfish, Loligo and Illex are for 4/1/81 thru 3/31/82.

Species	Catch this week	Catch to date	FCMA allocation	Percent taken
Bulgaria:				
Silver Hake	0.0	0.0	2,000	0.0
Red Hake	0.0	0.0	487	0.0
Mackerel	0.0	0.0	3,000	0.0
Butterfish	0.0	0.0	25	0.0
River Herring	0.0	0.0	25	0.0
Shark	0.0	0.0	0	0.0
Other finfish	0.0	0.0	3,778	0.0
Loligo	0.0	0.0	2,000	0.0
Illex	0.0	0.0	1,000	0.0

Species	Catch this week	Catch to date	FCMA allocation	Percent taken
Cuba:				
Silver Hake	0.0	0.0	0	0.0
Red Hake	0.0	0.0	0	0.0
Mackerel	0.0	0.0	7	0.0
Butterfish	0.0	0.0	5	0.0
River Herring	0.0	0.0	0	0.0
Shark	0.0	0.0	0	0.0
Other finfish	0.0	0.0	0	0.0
Loligo	0.0	0.0	125	0.0
Illex	0.0	0.0	234	0.0
Faeroe Islands (Denmark):				
Silver Hake	0.0	0.0	9	0.0
Red Hake	0.0	0.0	9	0.0
Mackerel	0.0	0.0	9	0.0
Butterfish	0.0	0.0	9	0.0
River Herring	0.0	0.0	9	0.0
Shark	0.0	0.0	500	0.0
Other finfish	0.0	0.0	100	0.0
Loligo	0.0	0.0	0	0.0
Illex	0.0	0.0	0	0.0
East Germany:				
Silver Hake	0.0	0.0	0	0.0
Red Hake	0.0	0.0	0	0.0
Mackerel	0.0	0.0	0	0.0
Butterfish	0.0	0.0	0	0.0
River Herring	0.0	0.0	0	0.0
Shark	0.0	0.0	0	0.0
Other finfish	0.0	0.0	0	0.0
Loligo	0.0	0.0	0	0.0
Illex	0.0	0.0	0	0.0
West Germany:				
Silver Hake	0.0	0.0	0	0.0
Red Hake	0.0	0.0	0	0.0
Mackerel	0.0	0.0	0	0.0
Butterfish	0.0	0.0	0	0.0
River Herring	0.0	0.0	0	0.0
Shark	0.0	0.0	0	0.0
Other finfish	0.0	0.0	0	0.0
Loligo	0.0	0.0	0	0.0
Illex	0.0	0.0	0	0.0
Italy:				
Silver Hake	28.6	485.3	2,000	24.3
Red Hake	0.0	14.2	487	2.9
Mackerel	143.6	1,869.1	2,610	71.6
Butterfish	0.5	66.9	150	44.6
River Herring	0.0	0.0	10	0.0
Shark	0.0	0.0	0	0.0
Other finfish	15.4	318.4	3,778	8.4
Loligo	6.8	3,264.6	6,950	47.0
Illex	6.0	3,213.8	6,170	52.1
Japan:				
Silver Hake	4.6	111.6	1,242	9.0
Red Hake	0.0	5.8	900	0.6
Mackerel	40.5	158.6	594	26.7
Butterfish	41.8	302.5	310	97.6
River Herring	0.0	0.4	10	4.0
Shark	0.0	0.0	0	0.0
Other finfish	5.0	387.8	3,778	10.3
Loligo	15.4	1,930.0	11,869	16.3
Illex	1.4	4,196.5	5,600	74.9
Mexico:				
Silver Hake	0.0	0.0	0	0.0
Red Hake	0.0	0.0	0	0.0
Mackerel	0.0	0.0	0	0.0

Species	Catch this week	Catch to date	FCMA allocation	Percent taken
Butterfish	0.0	0.0	0	0.0
River Herring	0.0	0.0	0	0.0
Shark	0.0	0.0	0	0.0
Other finfish	0.0	0.0	0	0.0
Loligo	0.0	0.0	0	0.0
Illex	0.0	0.0	0	0.0
Poland:				
Silver Hake	0.0	0.0	0	0.0
Red Hake	0.0	0.0	0	0.0
Mackerel	0.0	0.0	305	0.0
Butterfish	0.0	0.0	22	0.0
River Herring	0.0	0.0	0	0.0
Shark	0.0	0.0	0	0.0
Other finfish	0.0	0.0	0	0.0
Loligo	0.0	0.0	531	0.0
Illex	0.0	0.0	500	0.0
Portugal:				
Silver Hake	0.0	0.0	2,000	0.0
Red Hake	0.0	0.0	487	0.0
Mackerel	0.0	0.0	392	0.0
Butterfish	0.0	0.0	83	0.0
River Herring	0.0	0.0	5	0.0
Shark	0.0	0.0	0	0.0
Other finfish	0.0	0.0	3,778	0.0
Loligo	0.0	0.0	1,978	0.0
Illex	0.0	0.0	2,000	0.0
Romania:				
Silver Hake	0.0	0.0	0	0.0
Red Hake	0.0	0.0	0	0.0
Mackerel	0.0	0.0	0	0.0
Butterfish	0.0	0.0	0	0.0
River Herring	0.0	0.0	0	0.0
Shark	0.0	0.0	0	0.0
Other finfish	0.0	0.0	0	0.0
Loligo	0.0	0.0	0	0.0
Illex	0.0	0.0	0	0.0
Spain:				
Silver Hake	55.2	436.8	1,400	31.2
Red Hake	1.3	48.3	487	9.9
Mackerel	23.5	76.7	780	9.8
Butterfish	29.1	147.0	605	24.3
River Herring	0.0	0.0	20	0.0
Shark	0.0	0.0	0	0.0
Other finfish	50.8	715.7	3,778	18.9
Loligo	270.0	8,259.6	12,336	67.0
Illex	199.7	7,571.5	8,920	81.9
Total foreign effort:				
Silver Hake	88.4	1,033.7	8,642	12.0
Red Hake	1.3	68.3	2,848	2.4
Mackerel	207.6	2,101.4	7,688	27.4
Butterfish	71.4	516.4	1,200	43.0
River Herring	0.0	0.4	55	0.7
Shark	0.0	0.0	500	0.0
Other finfish	71.2	1,421.9	18,990	7.5
Loligo	292.2	13,454.2	35,789	37.6
Illex	207.1	14,981.8	24,424	61.3

The CHAIRMAN. Thank you, sir.

Mr. McDEVITT. Good morning. My name is Herman McDevitt and I am chairman of the Pacific Fishery Management Council.

For the record, I submitted to you earlier our written comments item by item on the staff proposed amendments—on the staff working draft two proposed amendments. I will not repeat that statement, but would like to make some general comments on the amendments, and secondly, as you requested, to comment on the administration's proposed budget for the National Marine Fisheries Service for the 1983 year.

With regard to the proposed amendments, we applaud the provisions in the draft which streamline the plan review process and reduce the paperwork burden on both the councils and the Federal agencies. It is especially critical that you have the ability to implement in season and between season changes quickly in order to respond to changes in the resources and fisheries as we experience them on the Pacific coast.

The current plan amendment process is too lengthy and often takes an entire year.

Second, we support the proposed exemptions from the Federal Advisory Committee Act and annual report requirements, which cost needless time and money. Exemption from that operation allows us flexibility to schedule meetings and, more importantly, is consistent with our view that the councils are policymaking entities and not mere advisers to the Department of Commerce.

Now, I would like to discuss the implications of the fiscal year 1983 NMFS budget. Many of the administration's proposed cuts seriously affect our council's ability to manage the fisheries that we currently have plans in place for. I am not talking about development of new plans.

The Pacific Council has placed almost all of its efforts on three major fisheries: salmon, mixed ground fish and anchovies. The basic plans for these fisheries have been developed. We have begun development of nine different plans, but have eliminated or postponed the others, which were not absolutely essential. We have eliminated all of our programmatic budget for the remainder of this year, except for those fishery plans I mentioned.

Our concern is that the proposed budget cuts will prevent us from managing these fisheries for which we have plans in place. The basic fishery and resource data required for ongoing management of these important fisheries cannot be collected or analyzed without that financial support. As an example, the administration's proposed elimination of the anadromous fishery grants and commercial fishery grants to the States—these are the basic funding programs for our council in the Pacific region and we sponsor fishery monitoring, data collection, analysis and research, essential to both the salmon and ground fish plans.

The Pacific Coastal States are responsible for collecting much of the data needs and are being asked to conduct these programs under the Magnuson Act management of the fisheries. They should not shoulder the entire burden created by the Federal act. As you know, the States do provide matching money for these grants.

We also note that planned reductions of $3.97 million for MARMAP and $3.6 million for economic and commercial fisheries statistics and marine recreational fisheries have been proposed. These reductions will significantly affect the NMFS fishery resource assessment capability which we depend on for our ground fish and anchovy plans.

Thank you for the opportunity to make this statement.

[The statement follows:]

STATEMENT OF HERMAN McDEVITT, CHAIRMAN, PACIFIC FISHERY MANAGEMENT COUNCIL

FOREIGN RECREATIONAL FISHING [SEC. 201]

This proposed amendment allows foreign vessels not operating for profit to fish in state waters and the FCZ under conditions imposed by the Secretary and the Governor of the state concerned.

We have no objection to this amendment.

NATIONAL STANDARDS [SEC. 301(B)]

This amendment clarifies that the National Standards Guidelines shall not require mandatory compliance.

We endorse this language change because guidelines are meant to *assist* the Councils and because there are regional differences in fishery management which require flexibility. Secretarial review should be limited to determination of FMP consistency with the Magnuson Act, the national standards, or other applicable law.

NORTHERN MARIANA ISLANDS [SEC. 302(A)(8)]

This provision adds the Northern Marianas as a voting member of the Western Pacific Council and extends Council jurisdiction to all U.S. possessions in the Pacific Ocean area.

We support this amendment.

APPOINTMENT OF MEMBERS BY THE SECRETARY [SEC. 302(B)]

This amends the Act (a) allowing the Secretary to question the qualifications of any individual nominated by a Governor; (2) requiring appointments to be made not less than 45 days before the first day of office; and (3) allowing the Secretary to remove any appointed Council member if the Council recommends removal by at least two-thirds of the voting members.

The Council supports the 45-day lead time for appointments; we have been inconvenienced in the past with delays in announcement of new members. this requirement will allow sufficient time to brief the new members on their new role and on critical issues which they will be voting on. The amendment should also stipulate a date when new members would assume their duties.

We also support the provision for removal of a Council member as long as the action is initiated by the Council as stated. In addition, we request that the Committee clarify the process and criteria for appointing a new member to replace the person removed.

PUBLIC PARTICIPATION [SEC. 302]

This amendment would exempt the Councils from the Federal Advisory Committee Act.

The Pacific Council supports this fully. The Councils believe that they are policymaking bodies, not merely advisors to the Department of Commerce.

FACA requires the Councils to transmit draft FEDERAL REGISTER notices of meetings to the National Marine Fisheries Service at least 25 days before the holding of such meetings; 45 days in advance if any portion of the meeting is closed to the public. The elimination of this requirement will allow more flexibility in scheduling meetings.

As a matter of practice, the Pacific Council announces its next meeting through a newsletter (circulation: 2,100) which is issued at the conclusion of each meeting. Followup notices describing issues to be discussed and copies of the proposed agenda are circulated to a special mailing list totaling 450 (including 104 members of the news media) several weeks prior to each Council meeting. "Reminder" release are sent at weekly intervals thereafter.

Members of the public are allowed to present their views to the Council during a regularly scheduled public comment period at each meeting. In addition, the public is permitted to testify on specific items on the agenda.

The Council supports the open meeting concept and will continue these practices to ensure the intent of the Federal Advisory Committee Act is fully observed.

ACTION BY THE SECRETARY [SEC. 304(A)]

The amendment would limit Secretarial review of a plan or amendment to determination of consistency with the national standards, any other provisions of the Act, and other applicable law. The plan would automatically go into effect if the Secretary did not disapprove it or partially disapprove it, within 60 days.

This is an excellent and key provision which will speed up the plan review process as well as prevent the Secretary from disapproving a plan for policy or other reasons not associated with applicable law. The Council then rightly remains the policy maker.

STATE JURISDICTION [SEC. 306(A)]

This language provides for state jurisdiction over pockets of water adjacent to the state and enclosed by lines delineating the territorial area.

We defer to other Councils who have experienced problems with FCZ enclaves in state waters.

OFFENSES [SEC. 309(B)]

As we understand it, this amendment would delete the provision for imprisonment except in the case of assault.

We do not believe people should be imprisoned for fishing violations, but support imprisonment for assault. We understand the amendment may cause serious enforcement problems, particularly with regard to foreign fishing violations. We defer to the office of NOAA General Counsel on this issue.

CIVIL FORFEITURES [SEC. 310(A)]

This authorizes the seizure of the *value* of the fish found in vessels violating the Act, rather than the fish.

It appears that this change would save time and money and avoid the loss in value of seized fish prior to the time they can be judicially forfeited. Since this is an enforcement issue we would like to hear the views of NOAA General Counsel.

REPORTS [SEC. 302 AND 311]

This eliminates the specific requirements for the Councils' annual report to the Secretary and the enforcement compliance reports submitted by the Coast Guard and Secretary.

We support this change because of the savings in time and money and because we question the utility of such reports.

The **CHAIRMAN**. Thank you, Mr. McDevitt.

Mr. Lee, representing the South Atlantic Council.

Mr. **LEE**. Thank you, Mr. Chairman.

I am O. B. Lee, chairman of the South Atlantic Council. And per your request, you asked us to just comment on things we disagreed with. So that cuts most of mine out, because we wholeheartedly support the Senate's position, the Senate committee's position, and the draft paper.

The **CHAIRMAN**. I would say that I find that, in looking through, if I were to take all of your comments my hunch is that all of you agree with about 80 or 85 percent of what we have. You all disagree with about 5 percent, and then the 10 percent is scattered among you. By and large you have been very supportive.

Mr. **LEE**. Absolutely. We really are. So I will not go into any discussion of those.

I would like to say just a word about the budget. I do agree with my colleagues sitting at the table, and we certainly agree with your authorization package. I think that any sizeable reduction in some of the programs that are indirectly related to the council, such as 88309, anadromous fish, would be very difficult. I do not know about the other States, but I do work for D&R in Florida and this is a program that we do not have the funds to accept, nor will our legislature help us too much. They cannot do it either.

So we certainly support your position. We would like to continue to work with the staff in helping this process through in any way we can.

And with that, Mr. Chairman, thank you very much.

[The statement follows:]

STATEMENT OF O. B. LEE, JR., CHAIRMAN, SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

Mr. Chairman and Members of the Committee, I am O. B. Lee, Jr., Chairman of the South Atlantic Fishery Management Council. I am pleased to present our Council's statement in support of your Staff Working Draft 2 dated April 19, 1982 on the reauthorization of and amendments to the Magnuson Fishery Conservation and Management Act.

I feel obligated to advise you that our Council has not discussed either of the drafts prepared by your staff. The March 17 Draft arriving during our March meeting, was copied and distributed to our members for their review. It would have been a major agenda item for our next meeting in May had not this hearing preceded our Council's meeting date. However, I have conferred with our staff in a hurried review of this second draft and we agree that the intent of these proposed amendments to the Act have been considered and endorsed by our members. We may wish to comment on any report that may result from conference discussions on this and other related legislation which is under consideration. This would allow our Council an opportunity to provide a more thorough and comprehensive response.

Our fishery resources are common property in trust to the government and their proper management is an important responsibility. The MFCMA is certainly landmark legislation in that it provides a mechanism for meeting this responsibility with input from those individuals who will be regulated and who are dependent upon those resources for their livelihood or recreation. But management of fisheries must be dynamic if it is to meet the requirements of changes that continually occur. The MFCMA is a good piece of legislation. However, refinements to the Act are needed to allow the Councils and their Federal partner, the NMFS, to be more responsive to these changes. We feel that the proposals being discussed today will go a long way toward meeting this need. We appreciate the work this Committee has done in this regard and we are in support of the draft.

Mr. Chairman, we feel compelled to express concern over the Administration's proposed reductions in appropriations for carrying out the provisions of the MFCMA. We understand that proposed budget cuts would reduce funding for the National Marine Fisheries Service by 33 percent. If these cuts are imposed, very important activities will have to be curtailed to the detriment of our Nation's fisheries. On the other hand, we are encouraged by the auhorization levels proposed in this Committee's draft. We consider that this enhancement in authorized appropriations is recognition of the priority need for improving the effectiveness of the programs necessary to carry out the provisions of the Act. Expanding the scope of fisheries monitoring, data collection, and management-related research are priority needs in providing the data base necessary for intelligent and realistic management.

We feel that the rapidly rising value of our fisheries to the U.S. economy fully justifies this level of investment in their conservation and management through the MFCMA.

This concludes my statement, Mr. Chairman. I will be happy to answer any questions. Thank you.

The CHAIRMAN. I have three or four questions. You can move the microphones around as you need them to answer.

The New England Council objects to the inclusion of the vessel buyback system and we have had some other comments about it. I am curious as to your particular objection.

Mr. CARROLL. I will tell you, Mr. Senator, that I am a relative newcomer to the process, and I wonder if I might invite my executive director to respond to that question.

The CHAIRMAN. Yes, fine.

Mr. MARSHALL. Thank you, Mr. Chairman.

The objection——

The CHAIRMAN. Give your name for the record.

Mr. MARSHALL. I am Douglas Marshall, executive director, New England Fishery Council.

Our council discussed at the meeting in Chicago and the subsequent meeting in Homer, Alaska, last year when the eight councils sat down together, a change which would allow collection of license fees in excess of the cost of administering a program for limited entry. This was a suggestion which originated with a member of the North Pacific Council and we did not have any objection to that, and that is what, in fact, went in the eight-council recommendation that came forward last July.

Since then there have been both on the House side and the Senate side other changes proposed relating to limited entry programs and to the vessel buyback programs. Our real objection and the reason that we came down the way we did in the written testimony that we have submitted was that, frankly, we simply had not had time to fully understand what is involved.

After some more discussion and some possible explanations of what was intended, I am not sure we would come out in total opposition to the whole thing, but we felt uncomfortable enough about it and about the fact that it really has not been discussed either in hearings on the House side or the Senate side, and certainly not among our own council members, that we were not willing to endorse any of the proposals contained in any of the draft bills.

The CHAIRMAN. Thank you.

Mr. Bryson, let me ask you a question. Your council and several others expressed a need for economic data as part of the plan production process. Do you need raw data? And you know the fear that some people have about the confidentiality. I am curious how much you really need and if you really think you need raw economic data.

How are you going to take care of I think the legitimate concerns that some have about confidentiality?

Mr. BRYSON. If the councils are going to be expected to prepare the regulatory impact analysis and the decision under 12291, in some cases we do need raw data. We have been justly criticized for our sources of information we have to date in those two statements. We simply do not have the information on the cases.

If we cannot get it from the processors or if the NMFS in their data collection does not collect that type of information, it would be even worse.

The CHAIRMAN. How about confidentiality?

Mr. BRYSON. As far as confidentiality, we have had a ruling from Justice early in the council process that the council employees would be under the same ruling as any other Federal employee, subject to the same penalties, fines, et cetera.

The CHAIRMAN. Yes. You see how well that works around here in terms of confidentiality.

Mr. BRYSON. Hopefully, the councils are no less responsible than any other——

The CHAIRMAN. God, I hope not.

That still is not an adequate standard.

Mr. Bryson. We can very easily set up methods. The councils themselves—and I think this has been expressed—they might fear what the competitors are doing. The councils—to my knowledge, no council member of any council, has asked to see raw data.

What they have asked for is, some of them, for their council staff to have access to handle this type data, not their members, just the staff and only key staff members at that. We could very easily limit ours to three people.

The Chairman. I was going to say, even then, when you try to determine key staff members, I try to do that on my staff and you would be amazed how many think they are key.

Mr. Bryson. If you have only seven to begin with, it is easier to get key out of it.

The Chairman. Mr. Putnam, on optimum yield, I want to hear your explanation for the view of the benefits to be determined by changing the requirement that optimum yield be achieved.

Mr. Putnam. Senator, quite often we are forced to achieve optimum yield—if the biological facts that go into a fishery are not achieved, you cannot achieve optimum yield. And if we are not doing that, then there is quite often surplus left over.

What we would like to do is to be allowed optimum yield where we can work toward allowing the achievement of optimum yield, not always be mandated to achieve it in order to make our plans sufficient, because there are a number of factors that determines what happens to the fish.

The Chairman. If we were to change in the direction you are suggesting, what do you think would be the effect on the size of the foreign fishing catch?

Mr. Putnam. I do not think it would basically have any effect on it initially. I think that it would be something that would happen down the road, and I really do not foresee any effect to it.

The Chairman. Thank you.

Mr. Branson. Well, go ahead.

Senator Stevens. No, go ahead.

The Chairman. Just one question and I will move on. Mr. Branson, you indicated that you believe that the councils do not have the authority to meet outside the area for which the council has authority. What led you to that conclusion? That was not our intention. I am curious, what led you to that conclusion?

Mr. Branson. The act itself specifically says that the council will meet only in its area of jurisdiction. And in the case of Alaska, why, that means that we cannot meet or technically hold public hearings in the State of Washington, for instance, where much of the industry is based.

The Chairman. Well, it is very clear that we did not mean to circumscribe you summarily, and if that is indeed the situation, as far as I am concerned, we will change the law.

Senator Gorton.

Senator Gorton. No questions.

The Chairman. Senator Stevens.

Senator Stevens. I am interested in a comment from any of you about the buyback provision. I know it came from a meeting in Homer, and at the same time I have heard a lot of comments about it. Is it linked in your minds to the limited entry provisions, and would it be possible—some of our fishermen say it would be possible to have a limited entry provision for a fishery that is brought about because of foreign allocations in the species involved in the fishery.

And what do you really think about this combination of limited entry and buyback?

Mr. **Branson**. May I take a shot at that, Mr. Chairman? When the decision was reached in Homer, as I recall it was more the thought that a limited entry system as such should be financed by the participants in the fishery, and if it involved a buyback program, why, we should be able to assess the fees necessary to accomplish that purpose, too.

Senator **Stevens**. Are you talking about salmon or are you talking about everything?

Mr. **Branson**. Well, any conceivable limited entry system, Senator. It is the North Pacific Council's intention, of course, not to consider limited entry for any fishery in which there is still some foreign participation.

Senator **Stevens**. This is based on public hearings participation, some prior participation of the active participants in fisheries involved before a council could enter into a limited entry program?

Mr. **Branson**. Absolutely. I am sure our council would not enter into a limited entry system that most of the industry was not in favor of, was not asking for.

Senator **Stevens**. So the buyback, would that be conditioned upon any democratic process of those involved who are going to have to pay the increased fee? Is there going to be a vote of the people involved in that fishery to accept the concept of increased fees before you can impose the law?

Mr. **Branson**. I think that is a given in any system that we would arrive at, Senator. It would have to be.

Senator **Stevens**. All right. I understand a little better, then. Thank you very much.

Mr. **McDevitt**. Mr. Chairman——

The **Chairman**. Go right ahead.

Mr. **McDevitt**. On the Pacific Council, that is a hard question, but our basic approach in this regard is proposing a limited entry workshop which will be held in late summer or early fall. As to each species you have a different problem in limited entry.

But in the Pacific coast where some of the States put, for example, their commercial salmon license with the boat and some others with the owner, and then some boats fish in more than one jurisdiction, including the North Pacific Council area as well as in our area, it gets quite complex.

Our general belief is that this is not only an educational process, but a cultural process, and we are pushing the workshop for that reason. We feel first that the industry has to really want it before any such system will work; second, then it has to be proposed under guarantees of fair play within that particular fishery, and that it must be done only among domestic fishermen and after any foreign impact on the fishery has been resolved.

I would say, with regard to the language in the proposed amendment, our council's philosophy is that they do not oppose anything that would allow a fee or a fund to be generated from those in the fishery for this purpose. I think it is foreseeable and we are going to have to have a limited entry program. But I think each particular limited entry or buyback program must be tailormade with the day to day cooperation and assistance of the fishermen themselves.

And it is with that philosophy that we are proposing this regional and national workshop for late summer, and you might want to send some of your staff people out.

Mr. **Bryson**. Senator Stevens, if I may. Would the industry participate, was part of your question. About 40 percent of the total industry participated in that concept, in 12 monthly meetings of our advisory panel. We put in the plan what they asked for. So I think it is working in that direction.

Senator **Stevens**. Thank you.

I think the capital construction fund concept builds into a successful fishery the upgrading and the improvement of efficiency, and automatically brings about the question of whether the gear in an area where the fishery has been successful is excessive for the species involved. Eventually it will. It is a matter of time, and I do think it is a matter of education, but it is also a matter of democracy in the particular fishery involved; that it not be imposed by Government, but it be a solution sought by the participants in the fishery themselves.

And on that basis I can support it. I could not support it on the basis that it just could be a management tool that would be imposed without regard to the participants' needs.

Thank you very much.

The **Chairman**. Senator Gorton? I have no other questions. Ted? [No response.]

The **Chairman**. Gentlemen, thank you very much.

It is my intention to run right through lunch and through the rest of the witnesses, and we will hear them in this order: Mr. Jensen, Mr. Donaldson, Mr. Skoog, Ms. Sloan, Mr. Frank, Mr. Meninick, and Mr. McMinds. So next we will take Mr. Ron Jensen.

Mr. Jensen is president of the National Fisheries Institute. He has with him Mr. Gus Fritschie.

STATEMENT OF RONALD JENSEN, SENIOR VICE PRESIDENT, CASTLE & COOKE, INC., AND PRESIDENT, NATIONAL FISHERIES INSTITUTE, ACCOMPANIED BY GUSTAVE FRISTSCHIE

Mr. **Jensen**. Mr. Chairman, Senator Gorton, Senator Stevens. I am here as the vacuum cleaner salesman.

I am Ronald Jensen, senior vice president of Castle & Cooke, president of Bumble Bee Seafoods, and president of Pan-Alaska Fisheries and president of the National Fisheries Institute.

I am pleased to have the opportunity to appear before this committee and comment on the proposed amendments to the Magnuson Fisheries Conservation and Management Act. During the past oversight hearing in the last Congress, the institute stated the following:

> Fundamentally, the MFCMA has been good for the U.S. fishing industry. Catches and earnings have increased.

I would have to amend that in this Congress and drop the word "earnings."

A spirit of optimism, a willingness to invest and get into new areas, pervades the industry. This is what we sought in supporting the MFCMA.

At the same time, the institute expressed concerns regarding the administration of the act, the application of the Federal Advisory Committee Act, the role of the regional councils, undue delay in the development and approval of fishery management plans, and the uncertain relationships between the councils and the Department of Commerce. Many of these concerns and others have also been expressed by the councils and other segments of the industry.

The institute has reviewed the amendments prepared by this committee and similar legislation pending in the House of Representatives, and believes that both proposals address many of these issues raised by the seafood industry. Enactment of the pending amendments will improve the administration of the act and complement ongoing efforts by industry and the Government to develop markets for underutilized species of fish.

At this point I would like to briefly comment on several of the provisions that are set forth in the proposed amendments. NFI supports the intent of section 3, which would provide for a reduction in the allocation granted to foreign nations. As I read this section, an allocation could be reduced for a number of reasons, including a foreign nation's failure to remove trade barriers and increase purchase of U.S. fish.

The institute supports section 6, which would clearly establish that the national standards are guidelines and that such guidelines shall not require mandatory compliance. From time to time there has been misunderstandings concerning the status of the guidelines, and this amendment will resolve these questions.

The institute supports section 8——

The CHAIRMAN. Mr. Jensen, let me say this. Please do not read your statement. It will be in the record. I read it already. You do not need just to reread exactly what we have.

Mr. JENSEN. OK. I would like to depart, then, and make the next point which is not part of the written testimony. Clearly the court decision in Alaska on the little-known NOAA legal opinion have significantly restricted Federal and State authority over foreign processing vessels within a State's internal waters, and raises an important MFCMA-related issue.

As the chairman recognized during last year's NFI convention, the potential presence of unregulated foreign vessels in ports and harbors around the United States is of paramount concern to the processing industry. The use of foreign labor, the existence of trade barriers to U.S.-processor products, and the nonfree market economies of certain nations permits foreign vessels to inequitably compete with U.S. site facilities.

Many segments of the U.S. processing industry are presently operating below capacity, and the opportunity for uncontrolled and unequal competition could lead to reduction in employment, capital investment, and domestic and export sales.

As you are aware, we have worked on this issue for more than 1 year. Legislation has passed the House which would reimpose a Federal ban on foreign processing vessels within internal waters, but would then permit the Governor of the State to grant permission to a foreign vessel if he determines that fish processors within the State do not have adequate capacity or will not utilize that capacity to process all of the U.S.-harvested fish from that fishery concerned that are landed in the State.

The only other condition would be a requirement that the nation have a GIFA or other international agreement with the United States. The action by the House will result in a Federal prohibition and permit regulation by State Governors. This is preferred to the unregulated condition which presently exists.

However, the processing industry believes that the pending House language does not totally and satisfactorily address our concerns. We support language which would: One, permit access on salmon and herring seaward of Alaska based on the lack of sufficient processing capacity; two, ban any access for fully utilized species except for salmon and herring in Alaska, and define fully utilized species as species for which there is no allowable level of foreign fishing; and three, allow the Governor to grant permission for underutilized species when he determines that the United States does not have sufficient processing capacity.

In conclusion, NFI supports the enactment of necessary amendments to the Marine Conservation Act. This legislation, together with the American Fisheries Promotion Act, illustrates the Congress commitment to fisheries management and development. The industry shares this commitment.

On other matters, last week the NFI board of directors voted to support the drafting of legislation to permit the use of foreign-built catcher-processors as U.S.-flag vessels in underutilized species. We look forward to working with the committee as we develop the proposal.

Thank you.

The CHAIRMAN. It is the intention of this committee to address ourselves to that very pressing, as far as I am concerned, internal waters processing issue in separate legislation, rather than this bill. But indeed we will address it, because the problem has not gotten any better.

You mentioned the institute's endorsement of the use of foreign-built catcher-processing vessels in U.S. waters. Can you give me an approximate idea as to the difference in cost between a foreign-built and a U.S.-built vessel?

Mr. JENSEN. Well, right now in a study that we have commissioned the approximate difference is, in a foreign vessel you can buy them anywhere from 20 to 30 percent of the value of what you would have to build a vessel in the United States. So you are talking about 20 to 30 percent of the value.

The CHAIRMAN. Are you saying that due to the difference in cost, if you built the vessel, it in the United States the financial return could not be enough to justify the investment?

Mr. JENSEN. No; it would not.

The CHAIRMAN. You suggested adding a mandatory seat on the council, the Pacific Council, for the State of California. Why is this necessary when their largest catch is tuna, which is already regulated, of course, under international management authority?

Mr. JENSEN. Let me pass this to Gus.

Mr. FRITSCHIE. Mr. Chairman, this has been a very serious issue for our California members for several years. At a recent board meeting the board declined to support a separate council for California, but in view of the many species that are harvested seaward of the coast of California that are regulated by the entire council we agreed to support one additional obligatory seat.

As you mentioned, tuna is an internationally regulated species and we support the continued exemption of tuna from the act. So what we are really trying to—is to evaluate balancing concerns of our California members and the willingness, at least at our board level, of our Washington and Oregon members to support the one additional seat for the State.

[The statement follows:]

STATEMENT OF RONALD JENSEN, PRESIDENT, NATIONAL FISHERIES INSTITUTE

Mr. Chairman, I am Ronald Jensen with Castle & Cooke, Inc. and President of the National Fisheries Institute. I am pleased to have an opportunity to appear before this Committee and comment on the proposed amendments to the Magnuson Fishery Conservation and Management Act. During a past oversight hearing, the Institute stated:

"Fundamentally, the MFCMA has been good for the United States fishing industry. Catches and earnings have increased. A spirit of optimism, a willingness to invest and get into new areas pervades the industry. This is what we sought in supporting the MFCMA."

At the same time, the Institute expressed concerns regarding the administration of the Act, the application of the Federal Advisory Committee Act, the role of the regional councils, undue delay in the development and approval of fishery management plans, and the uncertain relationship between the councils and the Department of Commerce. Many of these concerns and others have also been expressed by the councils and other segments of the industry.

The Institute has reviewed the amendments prepared by this Committee and similar legislation pending in the House of Representatives and believes that both proposals address many of the issues raised by the seafood industry. Enactment of the pending amendments will improve the administration of the Act and complement ongoing efforts by industry and the government to develop markets for underutilized species of fish.

At this point, I would like to briefly comment on several of the provisions set forth in the proposed amendments.

NFI supports the intent of Section 3 which would provide for a reduction in the allocation granted to a foreign nation if the Secretary of Commerce and the Secretary of State find that agreements considered to be significant factors in the determination of allocations have not been adequately complied with or fulfilled by the foreign nation. It is unclear whether this "understanding or agreements" encompass the fish and chips provisions set forth in Section 201(e) of the Act. It may be preferable to link any reduction provision to the fish and chips factors as well as "understandings or agreements" that the U.S. government may have with a foreign nation.

The Institute supports Section 6 which would clearly establish that the national standards are guidelines and that such guidelines shall not require mandatory compliance. From time to time there had been misunderstandings concerning the status of the guidelines and this amendment will resolve these questions.

This Institute supports Section 8 with regard to appointment of members to the councils by the Secretary. There had been concerns that individuals nominated by a state governor may not meet the Act's requirement that the nominees be knowledgeable or experienced with regard to the management, conservation or recreational or commercial harvest of the fishery resources. The proposed amendment will enable the Secretary to consult with the state governors with regard to the qualifications of nominated individuals.

The current law requires each council to prepare and submit to the Secretary a fishery management plan with respect to each fishery within its geographical area. There has been a growing realization that every fishery may not require federal management. Thus, the Institute supports the amendment which would enable the councils to determine whether a fishery within its jurisdiction required conservation and management through a fishery management plan.

The Institute supports Section 11 which provides that the Federal Advisory Committee Act (FACA) shall not apply to the councils, their committees or advisory panels. The application of FACA has led to debate regarding the status of the councils and has imposed public notice requirements which restrict the councils' ability to respond to emergency situations. Exemption from the provisions of the Act should eliminate the debate regarding the status of the councils. The need for public participation will be assured through the requirement that the councils establish procedures for open meetings and the opportunity to present oral or written statements.

At the present time the councils are not required to submit proposed regulations when submitting a proposed management plan or amendment to the Secretary. The Institute supports the amendment which would require any fishery management plan or amendment to include proposed regulations. The Institute also supports Section 15 of the Act which would limit the Secretary to disapproving or partially disapproving a plan or amendment submitted by a council. This provision and the associated time limitation should assist in limiting the delay which is sometimes associated with the management plan process and should assist in developing closer consultation between the council and the Secretary prior to the formal submittal of the plan or amendment.

The Institute supports the amendment with regard to the promulgation of emergency regulations. As proposed, the councils would have an enlarged role in the promulgation of emergency regulations and the expansion of the time period within which emergency regulations may remain in effect will provide an adequate period of time for the development of permanent regulations.

While not addressed in the proposed amendments, the Institute supports the creation of an additional obligatory seat on the Pacific Council for the State of California. Our members in the state have been significantly concerned with the fundamental issue of adequate representation by the state in the management of fishery resources by the Pacific Council. The state has a longer coastline than the other member states on the Pacific Council and many of the marine resources subject to the council's jurisdiction are primarily harvested seaward of California.

Mr. Chairman, earlier this year, I testified in Seattle before this Committee on the subject of development markets for underutilized species. At least three of the points I addressed at that hearing are linked to provisions of the MFCMA and illustrate the linkage between this Act and fisheries development. For example, it is a stated purpose of the MFCMA to encourage the development of underutilized species and to ensure that optimum yield determinations promote that development. This management tool, coupled with an aggressive implementation of the fish and chips policy, will assist the United States industry in developing expanded markets for underutilized species.

Other legislative initiatives will have to be examined if we are to achieve the Act's fisheries development goal. Last week, the NFI Board of Directors voted to supports the drafting of legislation to permit the use of foreign built catcher/processors as U.S.-flag vessels in underutilized species. We look forward to working with this Committee as we develop this proposal.

In conclusion, NFI supports the enactment of necessary amendments to the MFCMA. This legislation together with the American Fisheries Promotion Act illustrates the Congress' commitment to fishery management and development. The industry shares this commitment and appreciates your interest.

The CHAIRMAN. Thank you.

Gentlemen, I have no further questions. I appreciate your patience in waiting this long.

Mr. Donaldson is the director of the Oregon Department of Fish and Wildlife.

STATEMENT OF JOHN DONALDSON, DIRECTOR, OREGON DEPARTMENT OF FISH AND WILDLIFE

Mr. DONALDSON. Good morning, Mr. Chairman, fellow Oregonian. It is nice to see you again.

I would like to recognize my colleague to the north, the commissioner for the Alaska Department of Fisheries, Fish and Game, Mr. Ronald Skoog.

To be very brief with you, sir—I know your time is short and there are a few things we have to say. First, on the Magnuson Act and what you just heard Mr. Jensen say, we are here to submit to you for the record a resolution for the Pacific Marine Fisheries Commission—that is the five-State commission on the coast, west coast—that speaks to the same thing, an additional obligatory seat to the State of California.

We are not in favor of an additional member to the council. Leave the number at 13. And we are not in favor of the present House amendment, we understand which gives three obligatory seats in total to California. This would increase it from two by adding one more. So we will submit that for your record.

The **Chairman**. That will be in the record.

Mr. **Donaldson**. Now back to Federal funding and the questions that you were asking of Mr. Gordon earlier. I will be very brief here. As you know, we have been several years fighting the Federal funding question on the Columbia River hatcheries.

Currently, with the $3.5 million reduction in the total Columbia River program, the national fisheries program, which includes other than hatcheries, this is less than what was needed to run the hatcheries in total during this 1982 period. In Oregon alone, the trickle-down principle is functioning, so we are now at 71 percent reduction in our funding base proposed for 1983.

Obviously, this is a 71-percent reduction in numbers of fish. Numbers of fish are hard to reconcile, but it is a significant reduction, to say the least. Yes indeed, six of our seven hatcheries, plus two satellite ponds, will be closed. The only hatchery remaining open will be Bonneville hatchery, and if you care to know the other hatcheries that will be closed I will list those for you.

The **Chairman**. I want to make sure I have your answer, and what I think is the answer of every other State I have talked with. The State of Oregon and the State of Washington are not prepared to pick up these so-called additional partnership costs if the Federal Government withdraws its support.

Mr. **Donaldson**. No, sir, we are not fiscally capable of doing it, nor do we think it is morally and ethically correct.

The **Chairman**. I know what the States of Oregon and Washington have just been through in their special sessions of the legislature. It has been cut, cut, cut. And I am assuming that the Department of Fish and Wildlife had to take some of those cuts in addition to everyone else.

And I do not know where Oregon or Washington would come up with the additional money, and that is why I am intrigued with the Federal Government's partnership idea, that somehow, some way, someplace, magically the costs are going to be picked up.

Mr. **Donaldson**. That is not possible, sir, in the State of Oregon. I think that is probably correct for the State of Washington. I cannot speak for them.

As you may be aware, we are involved in some discussions among the State and Federal agencies and the Indian tribes in the Northwest to try and come up with some alternate funding sources. But this takes time, and we merely ask that this Congress would allow us to continue to operate the hatcheries, and somehow we will work out a sharing formula here that will recognize other user groups in the Northwest in sharing that user responsibility.

But even then, I do not think that the Federal Government in Washington should be removed from a portion of that responsibility. That has been going on for some 40 years now. So we would request that the funding be developed to fully operate those hatcheries, and that would be up to a $9.8 million figure to fully operate the hatcheries of the States of Washington and Oregon, and those two from the U.S. Fish and Wildlife Service.

Mr. Chairman, other than to say we certainly do support the grant in aid 89-304 and 88-309 funds, as well as additional members onto the councils, I am ready for any question you have, sir.

[The statement follows:]

STATEMENT OF JOHN DONALDSON, DIRECTOR, OREGON DEPARTMENT OF FISH AND WILDLIFE

The Oregon Department of Fish and Wildlife is deeply concerned about the serious impacts that will result to northwest fisheries from reduced funding in the proposed fiscal year 1983 budget for the National Marine Fisheries Service. These funding reductions will significantly curtail the Columbia River Program, eliminate all funding under the Anadromous Fish Act (Public Law 89-304) and the Commercial Fisheries Research and Development Act (Public Law 88-309), and will terminate all programmatic funding for work associated with the Pacific Fishery Management Council.

1. *Columbia River program.*—The Administration's budget proposes a $3.5 million reduction in the Columbia River Program from fiscal year 1982 funding levels. The hatchery operation portion of the fiscal year 1982 budget was $7.9 million. The Administration has proposed for the total Columbia River Program for fiscal year 1983 a budget of about $7.0 million (actual—$6.997) which includes the Federal research projects in addition to the State hatchery program. What appears as a $3.5 million cut is already greater due to inflation. To maintain the same level of fish production as in 1982, including inflation and maintenance, and additional $4.4 million is required as an add-on to the Administration's proposed $7.0 million fiscal year 1983 budget. We are not proposing an add-on for the Federal research program. The $4.4 million add-on will provide a total Columbia River Program budget for fiscal year 1983 of $11.4 million.

In specific terms, the impacts to Oregon from the proposed cuts will be drastic. National Marine Fisheries Service has proposed to allocate to Oregon only $910,400 of the total $7.0 million. We have prepared a budget requirement of $3,456,446 for fiscal year 1983 to maintain full hatchery production in the nine fish rearing facilities operated by Oregon. If the proposed budget cuts are enacted, fish production would be cut from 38.7 million to 11.3 million salmon and steelhead—a loss of over 27.4 million or about 71 percent of the hatchery fish currently being released into the Columbia River from just the Oregon Department facilities. These substantial cuts would require six fish hatcheries and two satellite rearing facilities in Oregon to close with only Bonneville Hatchery remaining at full production. The capital investment of the six hatchery facilities recommended for closure is over $10 million with a replacement value that is closer to $50 million. Total reduction in hatchery fish production for the Columbia River hatcheries (Ore.-Wash.) as proposed by NMFS would reduce the annual harvest of salmon and steelhead by northwest and Alaskan fishermen (both Indian and non-Indian) by about 1.2 million fish with an estimated economic value to the region of over $52 million.

We are alarmed that the Department of Commerce would propose such a drastic reduction in a program that just a year ago received such wide and sound support. The northwest fish agencies agreed at that time that alternate funding sources should be explored for future operation of Columbia River salmon facilities and related activities. This Department is involved in this effort as are other fisheries agencies through the Columbia River Fisheries Council. However, we recognize that implementation of any new funding option could not occur before fiscal year 1984. We believe the Columbia Fisheries Program must continue at the current production level until such time as alternate funds are acquired. To close hatcheries now while we are working towards new funding options does not make good managements sense nor does the decision provide a positive attitude in cooperatively achieving the Administration's ultimate goal.

Also, the proposed fiscal year 1983 budget for the Columbia Fisheries Program would severely curtail services to hatcheries for disease control, diet quality control, fish rearing practices, and fish food programming which have been cost effective programs to increase hatchery fish survival and thus, contribution to the fisheries.

In addition, maintenance and repair of irrigation diversion screens and fishways would be reduced in northeastern Oregon streams further impacting the survival of downstream migrant salmon and steelhead. These are the stocks of fish that the Treaty Indians primarily depend upon for their fisheries.

Recommendation.—The Department requests that $4.4 million be added to the proposed $7.0 million included in NMFS proposed fiscal year 1983 budget. This add-on would assure full hatchery production at all state and federal facilities that have traditionally been funded by the Columbia River Program. Oregon's share of the add-on would be about $2.6 million and will provide full hatchery production, hatchery technical services, and continued operation of the screen and fishway maintenance program.

2. Public Law 89-304 and Public Law 88-309 Programs.—Elimination of the Anadromous Fish Act (Public Law 89-304) funding will terminate a major portion of the Department's high survival diet project for a salmon as well as other aspects of the nutrition program. Fish disease services to hatcheries for salmon and steelhead will be cut in half and the fish disease research work would terminate. Survival studies involving time and size of release of hatchery fish will be reduced and studies on the effectiveness of therapeutic drugs will be eliminated. Over half of the coded wire tagging and recovery processing capability will be lost, seriously affecting other fish management programs relying on tagging information. Reduction in these programs alos reduces the agency's capability to obtain information for managing the critically important ocean salmon sport and commercial fisheries. There will be no in-season processing of data on harvest rates and consequently no in-season management capability to adjust seasons as is presently being utilized in the coastwide regulation of the fisheries. The lack of this management capability leads to severe economic impacts for the fisheries.

In the research area, the fiscal year 1983 proposed zero funding for the Anadromous Fish Act will reduce the study effort to develop ways of using hatchery fish to supplement the depressed wild populations. Lack of federal funds will require the termination of the program to eradicate a virus disease from one of the most important chinook stocks in Oregon. Several important studies on hatchery and natural production of chinook and coho salmon will be terminated.

With no funding for the Commercial Fisheries Research and Development Act (Public Law 88-309) we will seriously limit the management capability for groundfish, shrimp, and scallops. The groundfish work is in conjunction with the funding from the Regional Council and has the same basic management objectives. The shrimp work is related to assessing the status of the shrimp stocks, predicting abundance from year-class strength, and sampling the catch for incidence of small shrimp related to time, area and gear type. This information is all necessary for proper management. The scallop fishery in Oregon, because it is just developing, has very little base line data. We are in the process of developing such information. Harvest levels must be established with the best scientific knowledge to assure optimum harvest levels for the fishermen while maintaining the integrity of the stocks. The Department believes the federal government has a clear responsibility and a strong obligation to maintain funding for these programs. The passage of the Magnuson Fisheries Conservation and Management Act (MFCMA) has placed a substantial responsibility on the state to develop information on which to base regionwide ocean management plans for salmon and marine fish. The grant-in-aid programs (88-309) and (89-304), in which the state contributes a proportionate share of the dollars, are absolutely necessary in meeting this responsibility; notwithstanding the fact that state dollars make up the major support in the overall salmon program. The impact on anadromous fish of the federal dams on the Columbia River, the complications of United States-Canada salmon treaty negotiations, and the increased demands of ocean fishery management brought about by the MFCMA, are all factors which are explicitly related to the federal government, but which the state has had to deal with in its management program. The state cannot, and should not, be expected to assume all these responsibilities without the federal funding assistance that has been an integral part of the cooperative fish management programs of the past.

Recommendation.—The Department requests funding levels for fiscal year 1983 of $3 million for Public Law 89-304 and $5 million for Public Law 88-309 programs. The Oregon share of these funds would amount to about $740,000 for the continuation of two fish management and research programs.

3. *Elimination of Funding for Pacific Fishery Management Council Programs.*—The recommended cuts by NMFS will cause a reduction in processing ocean catch statistics in a rapid manner, monitoring the fisheries, recovering tagged fish, and working on a coastwide salmon plan. This will have the effect of further reducing

the Council's ability to develop management regulations for the ocean salmon fisheries.

Also, management efforts on groundfish stocks will be seriously reduced because of lack of timely information on harvest figures and impacts. Because of the vastly increased fishing effectiveness of modern fishing gear, the groundfish fleets can overfish the stocks if they are not closely monitored.

Recommendation.—The Department suggests that $667,000 be added to the Pacific Fishery Management Council's proposed fiscal year 1983 budget for the continuation of the studies and management programs conducted by the Council's member states under the FCMA.

In conclusion the Oregon Department of Fish and Wildlife respectfully requests the allocation of additional funds in the National Marine Fisheries Service budget for fiscal year 1983 that will provide for full fish production in the Columbia River hatcheries and will continue critical research and management programs that are vitally needed to sustain the region's valuable salmon and steelhead fisheries and which provide national economic benefits.

The CHAIRMAN. I have some, but I think I will let Mr. Skoog go first.

STATEMENT OF RONALD SKOOG, COMMISSIONER, ALASKA DEPARTMENT OF FISH AND GAME

Mr. SKOOG. My name is Ronald Skoog. I am head of the Alaska Department of Fish and Game.

The CHAIRMAN. Hold on, Mr. Skoog. Pull the microphone up a little closer. This room has bad acoustics and the people in back cannot hear you.

Mr. SKOOG. Ronald Skoog, head of the Alaska Department of Fish and Game.

I want to say, Alaska is quite supportive of the amendments being proposed for the MFCMA. I have a few comments on these and also some possible additions you might consider. My major topics revolve around foreign fishing, limited entry, enclaves of Federal waters, foreign processing, and the State management role.

I have reviewed the staff working draft of April 19. I would like to comment on several of the amendments briefly. Section 3, the reduction of foreign allocation, we are fully supportive of. We feel that only by getting tough with foreign nations through a fish-and-chips approach can we accomplish the well-being and expansion of the domestic industry. I interpret this amendment as an explicit direction, I hope, to the Departments of State and Commerce that such action is, in fact, necessary.

In addition, I have two other comments on foreign fisheries, the first with regard to observer coverage. The American Fisheries Promotion Act actually identified 100 percent coverage, and after 2 years I am rather disappointed in the fact that we are not very close to achieving this 100 percent coverage. We feel it is essential simply as one means of keeping foreign vessels operating according to law the way they should.

The second comment I have is on fisheries development generally. We think it should be emphasized of course. On the other hand, the development of new fisheries should not occur without good consideration being given to the possible adverse impacts on already fully utilized and well established existing domestic fisheries, such as halibut, salmon, and crab.

I am suggesting consideration of two amendments that appear in my prepared testimony, one to section 2(a)(7), one to section 2(b)(6), both essentially saying the same thing: "provided however, that such program shall have no significant adverse impact upon established U.S. fisheries."

I think this kind of language just reemphasizes within the FCMA that our intent is to not have adverse impacts upon existing industry and to support the domestic industry.

Section 5 on foreign recreational fishing. I do not have it in my prepared testimony, but I do support that as written. However, I understand that there may be some modification under consideration that would change the language to "foreign recreational fishing tournaments." If it applies only to tournaments, then presumably it would preclude people coming down from Canada in our State, for example, to Alaska waters in the southeast and being allowed to launch their boats there.

We would like to emphasize that we would like it to remain as it is worded in this April 19 draft.

The need for fishery management plans, I think that has pretty well been discussed and we certainly support the idea that you do not need a plan for every fishery that comes along.

Limited access system, section 12, we are in support of that. However, the language is somewhat unclear to me in that I am not sure whether the limited entry system would be entirely administered by the Federal Government or whether there would be an option, which we think desirable, to utilize a State system if it does, in fact, exist. We have had a limited entry system in Alaska for quite some time now and have found that this program is very costly to administer. It would also be undesirable to have two systems, a Federal and a State system, ongoing at the same time.

For example, on our troll salmon fishery now, it occurs both in the FCZ and the State waters, the territorial sea. We have a limited entry program for our fishermen. Right now it applies also to the FCZ. Now, if the Federal Government establishes their own system we would in effect have duplicate permit systems to cover the 2,500 or more participating fishermen.

I think the change proposed for the adoption of fishery management plans is very necessary. The current system is not timely, not effective, not efficient, and not responsive to the needs of either management or industry. Somehow we have got to do it better than we are, and I think sections 15 and 17 go a long way toward that.

State jurisdiction—section 18. I am pleased that the amendment as written, so far anyway, will resolve those enclaves that exist which are in fact entirely surrounded by State waters. However, in Alaska there is a different situation, and figure 1 of my handout illustrates the kind of situation we face within southeastern Alaska, where you actually have an extensive intrusion of Federal waters into the more inland waters of the State.

And that causes real problems, also, with the potential of different regulations in the Federal waters as opposed to the adjacent territorial sea. What we are proposing here is an amendment that could change the definition of the inner boundary of the FCZ to, where appropriate, to follow a line that would reflect the historical fishery management boundary that has been used in the past in Alaska. Part of the attachments go into detail here as to how that line was established in Alaska, was used prior to statehood by the Federal Government, was adopted later by the State after statehood.

Also, one comment—I think you have already mentioned this, Mr. Chairman——

The **CHAIRMAN**. I have to ask you to abbreviate on your closing here.

Mr. **SKOOG**. All right.

And that was the consideration of foreign processing in internal waters. I think it has been laid out enough in the testimony here.

I think the last thing, then—based upon the past 2 or 3 days of meetings we have had with NMFS, the emphasis of which has been the State management role in light of the reduction in Federal budgets—is simply how much of an increase in responsibilities should the States actually take on, and what can they take on?

[The statement follows:]

STATEMENT OF RONALD O. SKOOG, COMMISSIONER, ALASKA DEPARTMENT OF FISH AND GAME

I am Ronald O. Skoog, Commissioner of the Alaska Department of Fish and Game. I want to thank you, Mr. Chairman and the members of this Committee, for this opportunity to testify on behalf of the State of Alaska.

When Magnuson Fishery Conservation and Management Act was enacted, in 1976, the State of Alaska had for many years been managing the domestic fisheries off the Coast of Alaska. Beyond the three-mile jurisidictional boundary the State's system of management was implemented through landing laws which prohibited the sale or transportation of fish within State waters unless the fish were taken consistent with State regulations. This system of management has been working well. It has withstood court tests; it has offered adequate protection to the resource; and it has helped to maintain and build the strongest and most viable fisheries in the nation.

Alaska has a substantial investment in facilities, communications and information systems, vessels and other equipment, coupled with a cadre of experienced personnel capable of carying out the management, research, and enforcement programs needed to monitor the conduct of the fisheries and to assess the status of the fish resources.

It is the desire of the State of Alaska to continue to participate and to contribute to the management of offshore domestic fisheries. Our interest in doing so is to provide a management regime that will continue to foster the development and maintenance of a stable fishing industry. Alaska regards the seafood industry as one of its most important industries, particularly because it is based on a renewable resource that will contribute to Alaska's and the nation's economy through time—provided an effective management program is maintained. The seafood industry may well become the cornerstone of the State's economy once its petroleum resources are depleted. Because of our experience and interest in fisheries conservation and management, we have looked forward to sharing our views of the Magnuson Act with you.

Mr. Chairman, I have reviewed the "Staff Working Draft" of April 19 and would like to comment on several of the proposed amendments as well as of a few other issues.

Section 3 (Reduction of Allocation).—I endorse the proposal to require the Secretary of State to reduce a foreign nation's allocations when that nation is not responsive to our U.S. fisheries policies. Only by "getting tough" with foreign nations through the fish and chips approach can we accomplish the desired well-being and expansion of the domestic fish industry. I interpret this amendment as an explicit direction to the Departments of State and Commerce that such action is necessary.

Additionally, I have two other comments relative to foreign fisheries. First, the American Fisheries Promotion Act (AFPA) recognized the critical need to monitor the performance of foreign vessels by dictating full (i.e., 100 percent) observer coverage. Such coverage is essential to control the impact of the foreign fleets and to provide confidence that they in fact are complying with our laws. I am disappointed that after nearly two years, the Administration has not come closer to achieving this intent of the AFPA. I encourage whatever action can expedite the implementation of full observer coverage.

Second, because of the vast resources that occur off the Alaska coast, the rapid development of the U.S. fish industry has considerable benefit to Alaska. However, development of new fisheries should not occur without consideration for the impacts on the already fully utilized and well-established existing domestic fisheries (e.g., halibut, salmon and crab). I suggest that to emphasize the need for supporting existing fisheries in the development and implementation of Fishery Management Plans the following changes be made to the Magnuson Act:

Sec. 2(a)(7) is amended to read: "A national program for the development of fisheries which are underutilized or not utilized by the United States fishing industry, including bottom fish off Alaska, is necessary to assure that our citizens benefit from the employment, food supply, and revenue which could be generated thereby; provided however, that such program shall have no significant adverse impact upon established United States fisheries."

Sec. 2(b)(6) is amended to read: "to encourage the development by the United States fishing industry of fisheries which are currently underutilized or not utilized by United States fishermen, including bottom fish off Alaska; provided however, that this development shall have no significant adverse impact upon established United States fisheries."

Section 9 (Determination of Need for Plan).—Clarifies that a Fishery Management Plan is not necessary for each and every fishery and further that the justification for a plan shall be based on a demonstrated need for conservation and management that can be achieved only through a formal Fishery Management Plan. Adequate conservation and management that can be provided by a State management regime, for example, would preclude the need for a Federal Plan. I strongly support this amendment as a practical means of efficiently utilizing limited State and Federal fiscal resources by eliminating unnecessary and duplicative rulemaking and management.

Section 12 (Limited Access System).—Provides for administration of a limited access system by the Secretary. Alaska has an extensive limited entry program for selected fisheries and we have found this program to be costly to administer. I suggest, instead of Federal administration of such a program in the FCZ, that the optional use of State administration be considered where a State has experience and on ongoing limited entry program—to provide fiscal savings and also reduce unnecessary confusion to the fishing industry that might result from two concurrent systems.

Section 15 and 17 (Action by the Secretary and Relationship to Other Labs).—Clearly, it is necessary to improve the timeliness of adopting and implementing Fishery Management Plans. The current system is not timely, not effective, not efficient, and not responsive to the needs of either management or industry. Alaska and the other coastal States who contribute so much to the process are severely impacted by the burdensome and time-consuming requirements of the numerous associated Federal laws. The proposals in Sections 15 and 17 go a long way toward assuring an improved system that will bring Fishery Management Plans in line with realistic time frames.

Section 18 (State Jurisdiction).—I am pleased that this amendment finally will solve the "enclave" problem that several States have experienced.

The situation in Alaska, however, encompasses more than just enclaves (see Figure 1). Traditionally, the waters of Alaska have been managed for fisheries according to a straight baseline approach, which means that bays, inlets, and sounds have been regulated by the State. Management boundaries, enforcement efforts, and industry participation have been tied to this approach since before statehood in both State and Federal regulations (see Appendix A1). The inner boundary of the Fishery Conservation Zone should respect and reflect the traditional boundaries that coastal States have utilized to manage the near shore domestic fisheries historically.

From the standpoint of fisheries management jurisdiction only (i.e., not involving national defense interests or ownership of oil, gas, or mineral deposits), there are several remedies that can be pursued without debating the ownership of the seabed. Remedial action could include the following:

(1) Developing consistency between State and Federal regulations that apply to such enclaves and intrusions.

(2) Administratively transferring Federal fishery management responsibility to a State by a "memorandum of understanding"; by delegation of fishery management units within FMPs to exclude FCZ enclaves and intrusions so the State would regulate in absence of Federal regulation.

(3) Amending the Magnuson Act to provide for a "point to point" methodology of determining the location of the inner boundary of the FCZ, for the purposes of fishery management only.

The first two-options are not very feasible because offshore and nearshore fisheries do not necessarily require the same management (i.e., regulations may differ). Attempts at developing consistency between State and Federal regulations even when the State, the Secretary of Commerce, and the Council have agreed, have been difficult. The Federal regulatory process does not move quickly enough and cannot adjust to changing resource conditions as rapidly as can the States. Thus, Federal and State regulatory regimes are constantly out of phase. Even liberal use of emergency regulatory authority by NMFS has not been able to prevent inconsistent regulations in Alaska. Delegations of any Federal authority within the enclaves and intrusions as well as definitions of the fishery management units to exclude these waters from the jurisdiction of the FMP lack clear statutory authority and thus have dubious validity as solutions to the problems.

The third option would amend the Magnuson Act specifically and unequivocably to allow the inner boundary of the FCZ to reflect the historic fishery management boundaries for which the States have traditionally accepted responsibility. The amendment would make the inner boundary of the FCZ coterminous with a line delineating the seaward traditional fishery management boundary of each State. I support this approach and have appended language (Appendix A2) for such an amendment for your consideration.

An amendment providing for joint ventures within the boundaries of a State is a final item of particular and urgent concern to the State of Alaska. The diversity, extent, and value of this State's fisheries resources is well documented and the optimal utilization of these resources is basic to our economy and the nation's.

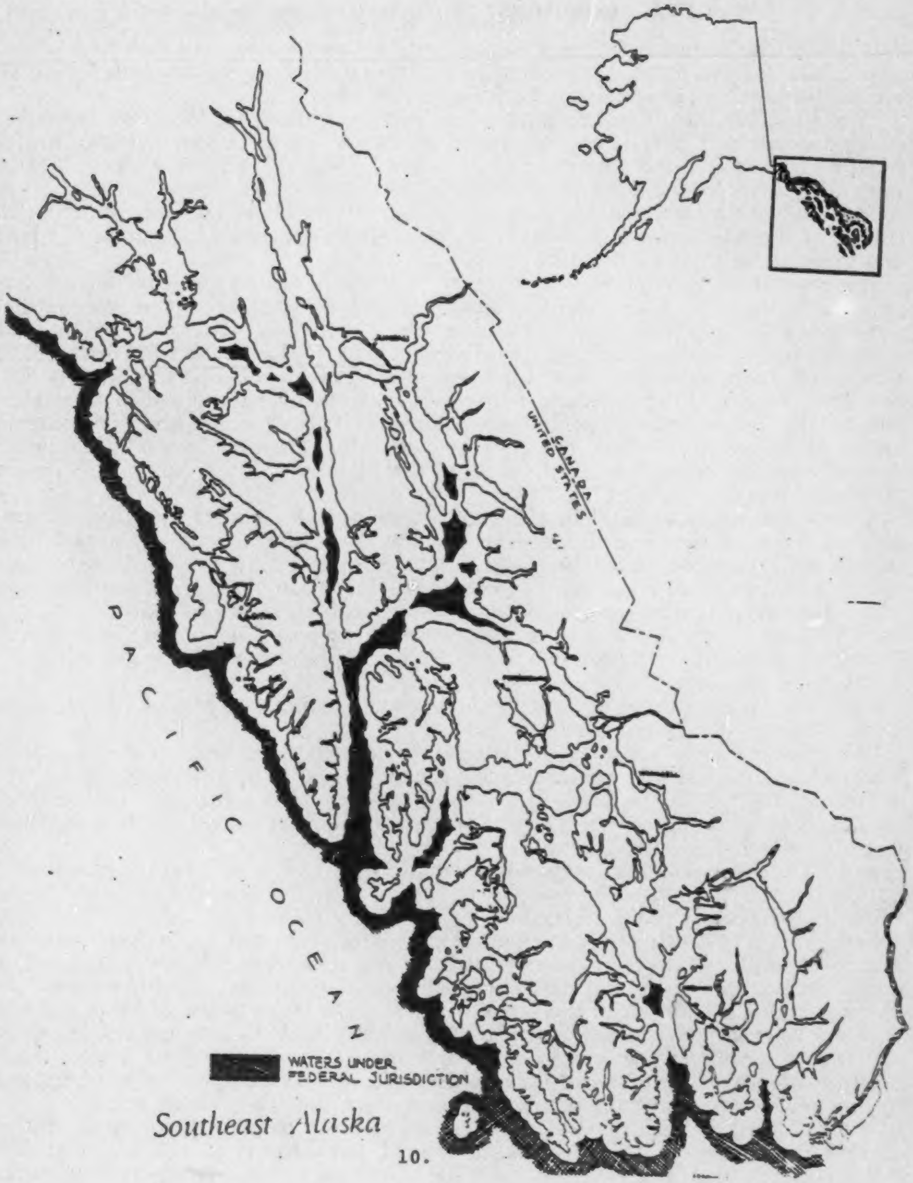
Just as the national program for the management of domestic fisheries offshore recognizes the need and allows for the use of foreign buyers of domestically caught fish, so did the State's program for managing inshore fisheries. In fact, Alaska had regulated this mechanism for many years—until a Federal court decision this past year struck down the State regulations, thereby creating a regulatory gap in regulating foreign processing activity in the internal waters.

A controlled use of foreign processors in State waters in no way attempts to undercut the operation of United States processing facilities. It is a means of providing for the sale of domestically caught fish only when a surplus occurs in a fishery and more fish are available to harvest than domestic processors can handle. The need for this mechanism clearly arises in Alaska, where, for example, fish populations can reach tremendous numbers, yet vary considerably from year to year (e.g., in 1974, the statewide harvest of salmon totalled only 22 million fish, but in 1980, the total was 110 million fish).

I hope the Committee will take immediate action to amend the Magnuson Act to allow the Governor of each coastal State to control the utilization of foreign processing vessels in State waters when domestic processors are unable to handle surplus quantities of fish.

This concludes my testimony, Mr. Chairman. I assure you that the State of Alaska will continue its sincere efforts in maintaining and improving the effective conservation and management of the marine fisheries resources off the coast of Alaska.

FIGURE 1


CANADA
UNITED STATES
PACIFIC OCEAN
▬ WATERS UNDER FEDERAL JURISDICTION

Southeast Alaska

BEST COPY AVAILABLE

[Appendix 1]

STATE/FEDERAL FISHERIES MANAGEMENT BOUNDARY OFF ALASKA

HISTORICAL DEVELOPMENT OF THE MANAGEMENT BOUNDARY

In 1957, the Secretary of the Interior first included among the fish and wildlife regulations for Alaska a comprehensive definition of those waters over which the United States claims exclusive fisheries jurisdiction:

"Waters of Alaska. For the purposes of these regulations, the term 'waters of Alaska' north and west of the International Boundary at Dixon Entrance are defined as including those extending three miles seaward (1) from the coast, (2) from lines extending from headland to headland across all bays, inlets, straits, passes, sounds and entrances, and (3) from any island or groups of islands, including the islands of the Alexander archipelago, and the waters between such groups of islands and the mainland. (50 CFR 101.19 [1959])"

The regulation cited above was adopted to exclude Alaska's coastal waters from other waters of the North Pacific Ocean which were subject to the International Convention for the High Seas Fisheries of the North Pacific Ocean. The boundary derived from this regulation was depicted on a map of Alaska by two United States Bureau of Commercial Fisheries employees, John T. Gharrett and Henry Clay Scudder. The so-called Gharrett-Scudder line generally enclosed those waters throughout which the United States had enforced domestic fishing regulations promulgated under the White Act of 1924. The boundary definition cited above is still included in Federal regulations to define the limits of the high seas of the North Pacific Area off the coast of Alaska (50 CFR 210).

Alaska attained statehood in 1959 and subsequently assumed exclusive management authority over domestic fisheries in 1960. The definition that was used to establish the Gharrett-Scudder line in 1957 was carried over from Federal regulations and included in State regulations to define the outer boundary of those waters over which the State claimed jurisdiction. 5 AAC 39.975(3) provides as follows:

"(13) 'Waters of Alaska' means the waters north and east of the International Boundary at Dixon Entrance including those extending three miles seaward:

"(A) from the coast;

"(B) from lines extending from headland to headland across all bays, inlets, straits, passes, sounds and entrances; and

"(C) from an island or group of islands, including the islands of the Alexander Archipelago, and the waters between the groups of islands on the mainland."

Thus in 1960, both the State and Federal governments recognized the Gharrett-Scudder line as the outer boundary of those waters over which the State of Alaska had exclusive fisheries jurisdiction.

In 1971 a Federal interdepartmental committee issued a set of provisional charts portraying the outer boundary of the territorial sea. The boundary selected by the committee generally occurred landward of the Gharrett-Scudder line and also established pockets of contiguous zone waters completely enclosed by the territorial sea. The State protested the "provisional" boundary in a hearing before the Senate Committee on Commerce arguing that a straight baseline method should have been used to determine the location of the boundary. The U.S. Department of State defended the new boundary by stating that use of a straight baseline method would encourage similar unilateral actions by other nations to the detriment of United States defense interests. The Federal position prevailed, largely because it was supported by an earlier Supreme Court interpretation of the Submerged Lands Act.

The Submerged Lands Act defines the seaward boundary of each coastal state as "a line three geographical miles distant from its coast line . . ." (43 USC 1312). The Act further defines "coastline" as the "line of ordinary low water along that portion of the coast which is in direct contact with the open sea and the line marking the seaward limit of inland waters." (43 USC 13——). Unfortunately the Act did not define "inland waters." A definition was, however, provided by the Supreme Court in United States v. California (381 US 139 [1965]). Briefly, the court concluded that Congress had left the term "inland waters" undefined within the Submerged Lands Act so that the court could provide the proper definition. The court then adopted the definition of "inland waters" provided by the 1958 Convention on the Territorial Sea and the Contiguous Zone. The Court further concluded that the correct interpretation of this definition should be made by the executive branch of the Federal government since the decision impinged on United States foreign policy. The Federal government's interpretation was subsequently manifested in the provisional charts.

The "provisional" boundary and the resulting enclaves and intrusion of waters of Alaska had little effect on fisheries management or enforcement in Alaska between 1971 and 1976. The State of Alaska continued to adopt domestic fishing regulations which were enforced beyond the limits of the territorial sea through landing laws that prohibited the landing of fish within the State unless such fish were taken in compliance with State regulations (16 AS 10.180–10.230). Foreign fishing in the contiguous zone pockets did not represent a problem because it was generally prohibited by the Contiguous Fisheries Zone Act of 1966. It is noteworthy, however, that the Contiguous Fisheries Zone Act permits foreign fishing in the contiguous zone by special agreement and that such an agreement had been reached between the United States and Canada which permitted Canadian fishermen to fish for halibut in the contiguous zone off Alaska. Canadian halibut fishermen did not, however, fish in the coniguous zone pockets after an initial instance in 1971 in deference to the State's position.

In 1976 the United States enacted the Fishery Conservation and Management Act (FCMA). Under the FCMA the Fishery Conservation Zone (FCZ) was established throughout which the United States exercises exclusive jurisdiction over fish resource other than highly migratory species. The inner boundary of the Fishery Conservation Zone is defined in the FCMA as "a line coterminous with the seaward boundary of each of the coastal states." This definition was clarified in the Conference Committee Report which accompanied the FCMA:

"The term "seaward boundary" when used in reference to a coastal state has the same meaning as is given to such term in the Submerged Lands Act of 1953 (43 USC 130(b))."

As a result the enclaves and intrusions are now part of the FCZ over which the Secretary of Commerce may allege fisheries jurisdiction.

[Appendix 2]

FISHERY CONSERVATION ZONE BOUNDARY

Section 3 of the Magnuson Fishery Conservation and Management Act is amended by inserting a new subsection as follows:

"(20) the term "seaward boundary of each of the coastal states" means the seaward boundary of the territorial sea or where applicable, the seaward traditional fishery management boundary of each state as recognized by the Secretary for purposes of implementing this Act."

Subsections (20) through (27) are renumbered (21) through (28), respectively.

Addendum to Statement of Ronald O. Skoog

"STATE MANAGEMENT ROLE IN OFFSHORE FISHERIES" AND "APPENDIX B. PROPOSED AMENDMENT TO SECTION 306 OF MFCMA"

STATE MANAGEMENT ROLE IN OFFSHORE FISHERIES

There is another issue I would like to discuss. I believe it is necessary to point out that coastal states can and should provide effective and efficient conservation and management for selected domestic fisheries in the Fishery Conservation Zone. There is need to eliminate unnecessary duplication of management and to capitalize on the flexibility and expertise of regional management.

The Federal government does have a significant role to play in offshore fisheries, but this role generally should be confined to controlling foreign fishing, assisting in the development of new and underutilized fisheries, and promoting research projects. Only if there are interstate conflicts over management of a domestic fishery should the Federal government need to intrude.

With regard to future State/Federal relations, I hope the role of the Federal government in the management of selected domestic fisheries is characterized by delegations of authority. If the Congress is sincere in its fiscal austerity, regulatory reform, and returning decision making authority back to State and local governments, then the proper environment exists to recognize the value of such delegations. All States, for a variety of reasons, may not want to assume, or reassume, management responsibilities. But, all States should have the option to petition the Federal government to be granted delegated authorities if they have the wherewithall and desire to reacquire, replace, or augment a Federal program.

I am not suggesting that the Federal government abrogate any national or international responsibilities. Under the delegations I envision, the Federal government would retain an oversight responsibility; the delegations to the States would be conditional—the conditions being ones which ensure the protection of national interests, and the application of national policies and standards. However, it is absolutely essential that these conditions of delegations of authority be reasonable; providing the State with broad ranging discretion and designed to minimize costly administrative overhead.

The North Pacifc Fishery Management Council has been considered by many as a model Council operation. I believe there are very good reasons for that Mr. Chairman. Since the inception of the Council, Alaska has taken the lead in the development of Fishery Management Plans for those fisheries which the State has traditionally managed. By doing so we hoped that the Federal management system and its impementing regulations would closely parallel those of the State of Alaska. We have been largely successful. The Secretary of Commerce has approved management plans that contain the State's domestic fisheries management regime.

The domestic fisheries of the North Pacific Region are still managed by the State. We provide the fishery monitoring, we perform most of the stock assessments, we collect all of the harvest data, we do the enforcement—we are in fact the day-to-day managers. The Federal government does not have the investment in manpower and facilities nor the expertise to actually manage Alaska's domestic fisheries.

Further, the State's regulatory entity, the Alaska Board of Fisheries, still promulgates, (after lengthy public participation) timely, responsive regulations that assure orderly fisheries throughout their ranges. During December 1979 the Board met in joint session with the North Pacific Fishery Management Council to consider routine, annual amendments to Tanner crab regulations. They each agreed to amend several of the regulations. The State's regulatory amendments became effective four months later, as scheduled. The Federal regulatory amendments have yet to become final—almost two years since they were adopted by the Council: However, the fishery has remained orderly and viable because industry responds to the State's regulations.

These experiences have been somewhat reassuring, but they also have been an excessive burden on the State which must now participate in two management systems in order to manage a single fishery. This not only places a dual workload on my Department but it also creates confusion among the public and the seafood industry. The present system contains an unacceptable amount of duplication, particularly in the public review process and in the promulgation of regulations. These burdensome procedures seem to violate the seventh national standard set forth in the FCMA, which is directed at minimizing costs and avoiding unnecessary duplication.

The Magnuson Act should be amended to direct the Secretary of Commerce to delegate authority of a domestic fishery in the FCZ to the adjacent state when and only if, two conditions exist: 1) the fishery does not cross interstate boundaries; and 2) the State is capable and willing to provide conservation and management consistent with the National Standards contained in the FCMA. Given these conditions there is no need for Federal management. It is duplicative, inefficient, and wasteful.

Language to effect this change is appended (Appendix B).

APPENDIX B—PROPOSED AMENDMENT

Subsection 306(a) is amended to read:

(a) IN GENERAL.—Except as provided in subsection (b) and (c), nothing in this Act shall be construed as extending or diminishing the jurisdiction or authority of any State within its boundaries. *Except as provided in subsection (c)*, no State may directly or indirectly regulate any fishing which is engaged in by any fishing vessel outside its boundaries, unless such vessel is registered under the laws of such State.

Section 306 is amended by adding a new subsection to read:

(c) EXCEPTION.—(1) In accordance with the procedures prescribed in this subsection (c), the Secretary, after consultation with the appropriate Council or Councils, shall delegate full authority under this Act for the management of any fishery in the fishery conservation zone that is engaged in only by vessels of the United States to that State, if any, which (A) is the only State adjacent to which the fishery in the fishery conservation zone is carried out;

(B) has, over the preceeding ten-year period, demonstrated a consistent and genuine interest in the conservation of the fishery resources exploited in the fishery in the fishery conservation zone and has engendered significant amounts of State revenue for their conservation;

(C) has adopted State laws and regulations, and has established and founded State agencies and instrumentalities that will ensure that the fishery in the fishery conservation zone is managed in accordance with the purposes, policy, and national standards of this Act; and

(D) will so manage that fishery in the fishery conservation zone.

(2) Upon the submission to the Secretary of a request by the Governor of a State that full management authority under this Act for fishery be delegated to that State in accordance with this subsection (c), the Secretary shall promptly transmit that request to the appropriate Council or Councils and publish notice of the request in the Federal Register, soliciting comments on the request from all interested persons. Within six months following receipt of the request by the Secretary, the Secretary shall either delegate full authority for management of the fishery under this Act to the requesting State or deny the request. The Secretary shall delegate the requested authority if he finds, on the basis of the request, consultation with the appropriate Council or Councils, and information submitted to him by interested persons, that the State satisfies the standards set forth in paragraph (c)(1) of this subsection. The State's management authority under this degation shall extend to all vessels of the United States, whether or not they are registered under the laws of that State.

(3) Upon receipt of a written allegation or petition, in such form and supported by such information as the Secretary may specify, that a State to which full management authority for a fishery in the fishery conservation zone has been delegated in accordance with this subsection (c) has ceased to satisfy any of the requirements set forth in paragraph (c)(1) of this subsection, the Secretary shall promptly notify the Governor of the State and the appropriate Council or Councils of such allegation or petition. Unless, within sixty days after his receipt of the allegation or petition, the Secretary has determined in light of consultations with the State and the appropriate Council or Councils that the allegation or petition is frivolous, the Secretary shall within six months after such receipt determine by adjudication on the record after opportunity for an agency hearing under section 554 of Title 5, United States Code, whether the State continues to meet all requirements of paragraph (c)(1) of this subsection. If the Secretary determines that the State has ceased to satisfy any of these requirements, he shall revoke the delegation of authority and take such measures as may be necessary to undertake management of the fishery in the fishery conservation zone in accordance with the other provisions of this Act. If the Secretary determines that the State continues to satisfy all requirements of paragraph (c)(1) of this subsection, he shall publish a notice in the Federal Register to that effect and shall not receive any other allegation under this paragraph concerning that State's management of that fishery for a period of two years following publication of that notice.

The CHAIRMAN. Let me ask you something about Alaska, because Senator Stevens, I have heard him often make the argument that Alaska might be willing to pick up a bigger share of the cost if they could have a bigger share of the responsibility.

Mr. SKOOG. We are probably a little different than all other States, because we have in fact carried out most of the work that NMFS, for example, has been doing on the east coast. We are in fact the agency that does all the data gathering. We do the enforcement work. And we actually do the management.

And so it would not be much of a change, actually. But of course, any drop in the NMFS program, such as the grant-in-aid programs, would have a fiscal impact; we have developed a whole array of projects that depend upon that Federal funding.

The CHAIRMAN. Is the State of Alaska prepared to pick up additional costs?

Mr. SKOOG. We are prepared, but it amounts to reprograming. Now, this year we are facing cutbacks——

The CHAIRMAN. You are prepared to what?

Mr. SKOOG. It necessitates reprograming in our existing budget. We have a budget now of about $60 million, $30 million of that is attached to commercial fisheries. We are going to maintain that probably this year.

If we get additional burdens of responsibility from NMFS, we are simply going to have to look at our priorities and see what we want to keep and what we do not. We do not mind accepting that responsibility, but the money is not necessarily going to be there. Something else is going to have to drop out.

The CHAIRMAN. OK. I think that would be a fair enough response for any other State, I think. If they have got *x* amount of dollars, and if they take on the responsibility, if it is forced on them, they are going to have to say, something has to go be cut.

Mr. SKOOG. I think every State is going to have to make that judgment on their overall program as to what is more important.

The CHAIRMAN. Mr. Donaldson, let me ask you, if we eliminate the funding totally for the Anadromous Fish Conservation Act and the Commercial Fisheries Research and Development Act, what is the effect on Oregon?

Mr. DONALDSON. That would be a reduction in programs, Mr. Chairman. The States already are picking up a fair share of those. You understand those are matching types of programs, and we would then get a higher percentage of the programs. With less funds we would do less. These extra activities——

The CHAIRMAN. It would be 100 percent of the program.

Mr. DONALDSON. We may have 100 percent of the program, which would be at considerably reduced spending.

The CHAIRMAN. What are your thoughts about the reductions on the management councils' moneys?

Mr. DONALDSON. A similar response to that, also. These are added responsibilities, upgrading the whole facility—for instance, our data processing and data retrieval systems are—it used to take a year or two to get the data out on salmon. Now we do it in 10 days. You only do that with extra technology and people with skills. That costs money.

Mr. SKOOG. May I comment on that, too?

The CHAIRMAN. Sure.

Mr. SKOOG. I think the councils could stand a reduction, frankly, in their operational moneys. I think they can get by with fewer meetings and so forth. However, those moneys that are given to the councils that actually help support the States in various kinds of programs, particularly data management, is very essential.

The CHAIRMAN. Mr. Donaldson, my question is based on hearsay, but I understand that the Northwest Power Planning Council heard arguments that the ocean fisheries share equal blame with the hydroelectric projects in terms of the condition of the upper Columbia River salmon runs. What is your view of that statement, assuming that the statement I heard is accurate?

Mr. DONALDSON. The statement as I recall is accurate. There was a statement, something about equal share, and from a consultant, power consultant that spoke to—Dr. Donald Chapman. The difficulty with that is that in fact it is not the way it is, and the best example of that and the one I used before the power planning council when I testified is that when you look at all the fisheries on the Columbia River, all of the salmon fisheries, including steelhead, there are two that are not caught commercially in the ocean.

They have had the same picture of falling off as have the other stocks. So how can you associate damaging effect of the ocean fisheries on those stocks that are not caught out there? And there are other supporting data that would take too long to get into here, sir.

The **Chairman**. Thank you, gentlemen. I have no more questions.

Mr. **Donaldson**. Mr. Chairman, if I may, I neglected to say I want to put in the record a letter from the Northwest Power Planning Council, signed by Gov. Don Evans, supporting the continuation of the funding of the hatchery programs until something else can be worked out. And I would like to have that submitted to the record.

The **Chairman**. It will be in the record.

Mr. **Skoog**. I have a request also. I received this letter from the United Fishermen of Alaska yesterday, and they asked me to introduce this into the record.

The **Chairman**. It will be put in the record.

Mr. **Skoog**. Thank you.

The **Chairman**. Thank you.

Next we will take Lucy Sloan, representing the National Federation of Fishermen. I have been watching you bop around back there, Lucy.

STATEMENT OF LUCY SLOAN, NATIONAL FEDERATION OF FISHERMEN

Ms. **Sloan**. Thank you, Mr. Chairman. And I wanted to thank you and your colleagues for the discussion that you had with Secretary Adams. Perhaps you have succeeded in communicating to him some of the things we have been trying to for over a year. I sincerely hope that your having had that discussion with him will perhaps reinforce our concerns much more strongly than we have been able to do.

The **Chairman**. As I said it is not limited to the Japanese fishing industry. We are trying to sell them beef and we have the same problem. We are trying to sell them timber. It is perpetually the same problem.

When they are driven right to the wall and it appears that they are going to go off the cliff, they will change. But not until what they regard as a disaster is almost upon them.

Ms. **Sloan**. I sincerely hope that you hastened their awareness of impending disaster, because we have not felt we have made all the progress we would like to.

I would like to talk about the 50-percent holdback idea. With it, we have already made some progress, though that which we have made has not been as great as we would have hoped. As you know, the Government people told the Government of Japan, for example, that we would like 200,000 metric tons from the Japanese joint ventures this year and so far they have come up with 60,000 and are very pleased with themselves for having done so. I grant you, that is an improvement over 14,000, but it is still 140,000 short of 200,000.

So we are keenly interested in having available to us the tools which we think are directly responsible for the progress that we have made. I think were we not to have had the problems that we have had in the past trying to implement the fish and chips policy, that the language that you have propcsed would be certainly desirable in terms of flexibility—but under the circumstances, I think at the moment we need the kind of plan we have got.

After all, as I said in my prepared remarks, we have a situation where, if the foreign governments and the foreign industry people make a commitment and follow through with it, they have nothing to worry about. We have this year, as you know, a substantial reserve and with that reserve I very much doubt that we are going to run out of fish to make available under all sorts of extraordinary circumstances.

So I would certainly ask, on behalf of our people, that we look at the possibility of codifying what we are now using, because it has, we think, been an extraordinarily effective tool. If it had not been for the support that Congress has given the State Department through the amendments which you have passed in 1980, I think we would not be where we are now. And your efforts have greatly reinforced the work that Mr. Cronmiller has been able to do.

We would like to be able to continue that, because you know what the situation is in terms of our need to expand our opportunities. I think, too, that we very much would like to see the proposed amendment to what we call the basket clause (sec. 201(e)(H)), because it serves to reinforce the TALFF criteria which you passed in 1980. It would become another part of the ongoing process.

If we were able to have the basket clause deal only with fisheries matters, that could clearly benefit our industry. For example, as you all pointed out, the Soviets are doing quite well in joint ventures and they have no directed quota. If the basket clause had read as the proposed amendment reads, we would not be in the position now of having to worry about whether we will be able to extend some of those operations. And again, it is a question of needing critically every market on which we can get our hands.

Then, looking at the determination of need for fishery management plans in addition to the points which are raised in my prepared remarks, I have talked with some of my people, who have indicated in some cases review of the biology will indicate that perhaps a plan may not be necessary. So I would like to add—and I will discuss this with staff—that the consideration of biological data with certain parameters and criteria be part of the process for determining the need for FMP's.

Also, we certainly favor deregulation. But we are looking at using the plan process through the councils as a way of protecting all fishermen, rather than continuing to face some of the problems that we have had in certain areas. So we would like to see plans pursuant to criteria, either as we suggested or criteria designed to accomplish the same ends.

On the limited access system, I would raise the question of whether we are dealing here with a management measure or something which is potentially revenue generating, and whether in fact it is appropriate for the councils to be involved in the generation of revenue. I think there is a fine line and it bears some more looking at.

As we have said before, we have real concern about Federal limited entry systems or any Federal endorsement of limited entry systems. And I would like to know what the parameters are on the revenue question.

I see my time is up. I will discuss the rest of it with the staff, then.

The **Chairman**. Two questions. Give me your views about the necessity for a 100-percent observer program.

Ms. **Sloan**. I think that is absolutely imperative. We have been proposing a 100-percent observer program since 1974. That was our answer to the opponents of the 200-mile law, who said that we could not possibly have Coast Guard coverage bow to stern, bow to stern. We said, "We quite agree; the logical thing to do would be to put on 100-percent observer coverage on foreign vessels."

Here we are, what, 8 years later. We think it is very, very important.

The **Chairman**. How do you answer the argument that 30 percent is perfectly adequate, that you get a good sampling, and what you gain by an additional 70 percent would be de minimis?

Ms. **Sloan**. I could give a flippant answer for that, given the sector from which that argument came. It would certainly continue to allow amounts of underlogging, which we have seen without observers.

The **Chairman**. Allow what, Lucy?

Ms. **Sloan**. Underlogging. It is much easier for the vessel without an observer to underlog. One of the interesting things we found on the east coast was that in a fishery where we had suspected that the foreign nation involved was catching considerably more than they were reporting, we found that when we put observers aboard the vessels of that nation, by golly! the catches and statistics increased extraordinarily.

The **Chairman**. Let me ask you, are you saying that in essence, without an observer almost every foreign fishing vessel is going to cheat?

Ms. **Sloan**. Not every one, but I think if they get on fish and they have an opportunity to get it, and if by getting it in the directed fishery they are not going to have to buy it from U.S. fishermen at perhaps a higher cost, yes, I think we seriously risk having underlogging.

I think we have enough indications from enough fisheries to see that underlogging is very serious. And the 100-percent observer coverage, in addition to providing the compliance with U.S. regulations, would also perhaps allow us to have a better understanding, in some cases where we are getting mixtures of catches, what it is actually that we are getting. We would not be forced to rely just on the reports we are getting from the foreigners.

The 100-percent observer coverage is absolutely essential if we are going to do the management job we hope to do.

The **Chairman**. Second, run through again the questions on section 9, the determination of the need for a plan, and the fears that you have. You know, it is a new approach and we need comments, and I want your comments a little more fully.

Ms. **Sloan**. We are concerned on that one, Mr. Chairman, because we, as you know, are trying to work on a fishery management plan in which we feel there are potential violations of both the fourth and fifth national standards if that proposal were to go forward as it is presently outlined. We think that plans may be extraordinarily flexible. We can look at different ways of implementing them.

Certainly my people are not eager to be under the burden of regulation. We would like to streamline that process. But we want to make sure that both the industry and the resources are protected by looking at such things as the value of the fishery.

One of the difficulties we have had with this whole process up until the passage of the 200-mile law and the additional work that you and the Congress have done is that there has been very little understanding traditionally among so-called fisheries managers that the reason we can justify spending taxpayers' money for this exercise is not so that we are insuring that herring and pollock enjoy their birthday presents but rather that the fishing industry is something which generates income to the U.S. economy.

You know very well how important the industry is in the coastal communities. It is significantly more important there than it shows up in the GNP. And I think that what we are trying to do is to insure that in determining the needs for plans, we do not in any way jeopardize the standing of the industry in any fishery in any area.

I am much less concerned about the resource, because we have found repeatedly that before a resource becomes threatened biologically, the catch per unit effort goes down sufficiently to make it uneconomic to fish for it. So I am not as worried about the diminution of the resource as I am about the economic impacts on the industry and on the coastal communities of which they are an integral part. And it is for that reason that I am concerned that determinations of needs for plans be reviewed very, very thoroughly.

I was extremely concerned, as I said in my prepared remarks, that the council only would submit a brief statement as to why it did not do that. If a council is not going to have a plan, I would like to go through a fairly extensive—and by that I mean 3- to 6-month—period of hearings and comments and discussion and so forth, before the council submits the written detailed report that the proposed legislation would require from the Secretary.

The **CHAIRMAN**. Lucy, I have no more questions. I thank you very much.

Ms. **SLOAN**. Thank you.

[The statement follows:]

STATEMENT OF LUCY SLOAN, NATIONAL FEDERATION OF FISHERMEN

Good day, Mr. Chairman, Senator. I'm Lucy Sloan, Excutive Director of the National Federation of Fishermen. NFF is the only national organization of commercial fishermen. We represent a majority of the organized commercial fishermen in the United States. Our members fish from Mexico to Alaska and from the Gulf of Maine to the Gulf of Mexico. Among the species they harvest are groundfish, salmon, crab, albacore tuna, shrimp, black cod, Pacific whiting, pollock, swordfish, sea bass, lobster, eels, clams, and oysters.

We appreciate the opportunity to discuss with you this round of proposed amendments to the MFCMA. Although I'll use as the basic for our comments what I think is the most recent staff working draft, I'll also discuss some proposals which have been made elsewhere.

Reduction of allocation.—We are extremely pleased to have this included in the working draft, but we would like to tighten the language in proposed (3)(A) more nearly to reflect the policy which the Department of State is implementing now. What we are calling the 50 percent holdback system provides the Deputy Assistant Secretary for Oceans and Fisheries Affairs with greater leverage than we've ever had, and we've like to have that leverage codified to ensure that this reinforcement of the fish and chips policy will continue. Although we've heard numerous arguments about how this policy allegedly makes it much more difficult for foreign nations fishing in our fishery conservation zone to plan, we remain essentially unpersuaded. After all, if a foreign nation truly seeks to participate in fulfilling the extended criteria for allocations of any total allowable level of foreign fishing, the quota which, at the first of the year, the Department of State sets aside for the nation will remain constant under the present policy. Remember that this present policy does include a substantial reserve, thus ensuring that even were domestic annual harvest (DAH) to increase, either through deliveries to US processors or through additional joint venture deliveries, the likelihood of having to reduce TALFF quotas is extremely low to non-existent, as it should be.

Further, we would strongly urge that the Committee consider adding to its bill an amendment to the law (Sec. 201(e)(1)(H)) as follows: "(H) such other matters involving the fisheries as the Secretary of State, in cooperation with the Secretary, deems appropriate."

National standards.—The addition of "Such guidelines shall not require mandatory compliance." to Sec. 301(b) is long overdue. Thank you.

Appointment of members by the Secretary.—As regards the proposed amendment for Secretarial removal of a Council member, we think this escape clause could be appropriate, but we suggest that at least the legislative history reflect what "cause" might be, and further, that the amendment be expanded to include a timely appeal process.

Determination of need for plan.—In the proposed amendment to Sec. 302, we are concerned that there be clearly established criteria for whether a fishery management plan is necessary. For example, we think that the following criteria, or others drafted to serve the same purposes, should be adopted as well if this amendment is accepted:

The value or the potential value of the fishery;

Whether fisherman from more than one state participate in or are planning to participate in the fishery; if the fishery is or is potentially fished by fishermen from more than one state, then the fishery should have a management plan to ensure compliance with the National Standards, especially Nos. 4 and 5;

Whether the resource if found in the fishery conservation zone off more than one state; if so, there should be a plan;

Whether the fish are landed in different states by citizens of more than one state; if so, there should be a plan; and

The conformity of states' regulations with one another if stocks are found significantly both within states' waters and the fishery conservation zone.

Although we understand the constraints explicit in seeking to balance the budget, we wish to do all that is necessary to assure that both the industry and the resource are adequately safeguard under the law.

Further, in proposed Sec. 302(i)(l), the Council is only required to submit a brief written justification of its determination to the Secretary, while the Secretary, in (i)(3) is required to respond in a written, detailed explanation. We think the latter is appropriate, but we think the Council as well should provide a thorough explanation of its determination, after public review, including hearings on any Council's preliminary determination.

And, in (i)(4), we think the Council or the Secretary should be required to initiate review if a significant portion of the industry requests it through a written, detailed account.

Public participation.—We would be delighted to have the Councils out from under the Federal Advisory Ctte Act. We would, however, request that the amendment include public access to the actual planning processes, whether these be plan development teams, plan maintenance teams, or Council staffs activities. This access need not directly include public participation during the conduct of business, but rather, perhaps, the public attendance we now have a Congressional markups.

We also appreciate that you have included an amendment to publish timely notice of meetings in newspapers and use other methods which will result in wide publiicity. NFF made this suggestion in 1975.

We would urge that at least the legislative history, if not an amendment, clearly indicate what might constitute such an emergency that the Council would not at least be able to publish newspaper notices. We are concerned that this not be used to minimize public involvement in critical issues.

Limited access system.—Our members have repeatedly expressed concerns that limited entry not become an issue for federal legislation. We did not like 303(b)(6) when it was written, though, of course, we recognized that our concern was not universal. We do, however, have all the same reservations about this proposal, although it may be the lesser of the evils when one considers the proposal language in H.R. 5002. If it were to become necessary to establish fees, we would like to discuss what criteria for doing so were to be. To those who do not want limited entry systems anywhere, this smacks of taxation without representation.

Regulations, action by the Secretary, and implementation of fishery management plans.—I've discussed with staff some of our confusions about how these processes would work, and we look forward to working with you and your staff to ensure that adequate public access is permitted without slowing down your commendable effort to streamline the process. We certainly are in favor of that objective!

As regards *Emergency Actions,* we are cautious about effects of the proposed amendment to Sec. 305 which addresses an emergency without regard to whether a fishery management plan exists for such fishery and allows the Secretary to promulgate emergency regulations to deal with it. How does the Secretary find that there is an emergency if there is no plan?

Data collection programs.—Although we are concerned to ensure that the Councils understand what data they think they need and that they are able to have the best available data to develop fishery management plans, we would like to discuss with you more fully how this might be done. As you know, many of our members have gone on record in various fisheries to reflect their concerns that mandatory—and often badly conceived—logbooks are worse than useless mechanisms for acquiring necessary data.

Relationship to other laws.—We hope that this will serve to streamline Council operations. Good.

Foreign fishing observers.—We assume "compliance monitoring" is not enforcement. And although we think science related to the fishery in progress is essential, we are cautious indeed about "such other scientific programs relating to the conservation and management as the Secretary deems appropriate." We don't want our observers turned into scientists of opportunity if it will in any way impede their fulfilling their primary responsibilities.

Finally, although your proposed amendments do not include changing the memberships of any Councils, we continue to be concerned about two of these: the North Pacific Council and the Pacific Council. On the former, to achieve something which more nearly reflects the scope of that Council's activities, we urge three additional seats: two for Washington, one for Oregon. And for the latter, at least one more seat for California would seem appropriate when one examines the problems in the fisheries for which that Council has responsibilities.

Thank you.

The CHAIRMAN. We will conclude with Mr. Meninick and Mr. McMinds. Gentlemen, are you ready?

STATEMENTS OF JOHNSON MENINICK, CHAIRMAN, TRIBAL COUNCIL, YAKIMA INDIAN NATION, COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION; HAROLD CULPUS, COMMISSION MEMBER AND CHAIRMAN, WARM SPRINGS TRIBAL COUNCIL; AND GUY McMINDS, Jr., COMMISSIONER, QUINAULT TREATY AREA, NORTHWEST INDIAN FISHERIES COMMISSION

Mr. MENINICK. Mr. Chairman, we appreciate the opportunity to appear before you today at this hearing. I have with me Mr. Harold Culpus to my left here, who is the Chairman of the Fish and Wildlife Committee and a member of the tribal council of the Warm Springs Tribe, also chairman of the Inter-Tribal Fish Commission of the Four Tribes in the Northwest.

Our concern here is primarily in regards to wild stock that we have in the Northwest that has been in existence, for many years, and had been the aboriginal fisheries that have been there. And we have also a natural spawning area that have been there for years and years and are still there.

However, there has been some interruption of the natural spawning areas, but we are primarily concerned that those wild stocks remain intact because we respect those stocks within our own religion of our Indian people. Economics has a different view of these fisheries, and we are primarily concerned with fisheries interruptions that we have, that in a way have caused a loss of many of these fisheries. But we are primarily concerned that these fisheries have their natural spawning stocks for hundreds of miles on the Columbia River system in the Northwest.

And if there are any technical questions we will entertain them, as accurately as we can. But the purpose today here is to express the concern of our Nation in the survival of natural spawning stocks of salmon in the Pacific Northwest and specifically in the Columbia River system.

I urge you to consider the testimony filed on the Columbia River tribes dealing with specific amendments proposals. Many reasons have been presented why the natural stocks need to be preserved and I endorse them all.

I wish to emphasize a specific aspect of the issue, which is the economic benefit of protection of wild stocks. In spite of comments to the contrary, the Columbia River still supports significant numbers of wild fish, and also contains hundreds of miles of readily available natural spawning habitat, which is presently used by wild fish. This habitat was provided by the creator and it does not cost a penny to maintain it.

And nature's hatchery is still abundant and available. All that is necessary is immediate protection to increase the fish. In times of economic hardships, we are already faced with possible closures of Columbia River hatcheries, such as the action at the present time, disastrous to all aspects of the fisheries industry. Natural stocks in their present status cannot take up the gap created by the closure.

An immediate realistic solution is to amend FCMA to protect the viable wild stocks, to provide fish for the hatcheries available for our streams. Such actions would increase escapement throughout the Columbia River Basin and would quickly build up natural stocks at virtually no cost for the production.

The power planning council established under the Northwest Power Act has by its comments and questions at a specific hearing addressing the Columbia River runs clearly indicated its interest to protect wild stocks at hydrodams. It has also indicated that such protection will only be afforded to those stocks that are given protection from overharvest by indiscriminate ocean fishing.

The amendment of the FCMA to provide such protection would mesh perfectly with the protection of these stocks by the power council. To do otherwise risks loss of stocks and detriment to all fishing interests.

We are quite concerned about the practices and management of the fisheries. We have other jurisdictions that overlap in some areas, and their actions actually affect the Indian nations within that area who have natural spawning areas, and stocks in those areas. It is in a way an assist to us, but however a natural stock is the viable stock that we are protecting, because——

The CHAIRMAN. I am going to have to ask you to conclude on your statement. We are limiting the witnesses. Your entire statement will be in the record, but I have to cut you down on time. So if you could abbreviate it I would appreciate it.

Mr. **Meninick**. OK. We have submitted our statement also in writing, and we are just summarizing as to what we have and that will be in the record.

The **Chairman**. That is correct. The entire statement will be in the record.

[The statement follows:]

STATEMENT OF JOHNSON MENINICK, CHAIRMAN, TRIBAL COUNCIL, YAKIMA NATION, COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

The preparation of this statement was prompted by the convergence of three factors. First, the Magnuson Fishery Conservation and Management Act (MFCMA) is due for reauthorization in 1982. As part of that process, Congress is considering areas in which the Act needs revision and improvement. As a result of the reauthorization process, bills have been introduced in both Houses of Congress to amend the MFCMA. In addition, the Senate Commerce Committee staff has developed a draft bill, which they requested that we evaluate.

Second, many of the naturally spawning salmon stocks are in a seriously depleted state. In commenting upon one aspect of this problem, the Under Secretary of the Department of the Interior recently noted that a "potential harvest of 1.3 to 1.7 million fish is being foregone annually because of under escapement of chinook salmon to Northwest rivers from the Columbia River to Cape Suckling, Alaska".

And third, congressional oversight hearings have identified several deficiencies in the Magnuson Fishery Conservation and Management Act as it affects conservation and management of salmon stocks, especially naturally spawning stocks. We believe that a comprehensive, coastwide management effort is urgently needed to ensure the survival and the restoration of the anadromous fish resource.

It is in the context of all these factors that we offer our assessment of the staff draft bill, as well as our recommendations for legislative action on the MFCMA. Initially, we have concluded that it is important that Congress consider several legislative modifications of the MFCMA to resolve the institutional barriers to protection of wild stocks identified in the Congressional oversight of the MFCMA. In addition, we have concluded that certain provisions of the staff draft amendments, when viewed as a whole, would hinder fulfillment of the Act's purposes of managing and conserving fishery resources off the coast of the United States. We are further concerned that elements of the draft bill—we have labeled these the "defederalization" provisions—would confound the urgent need for conservation of natually spawning salmon stocks.

Accordingly, we urge that Congress give careful consideration to the proposals for legislative action contained herein. In addition, we urge the Congress to cautiously consider the ramifications of curtailing the authority and responsibility of the Secretary of Commerce in management of salmon fisheries. The balance of this letter was developed in order to substantiate our proposals for legislative modification of the MFCMA particularly in the area of protection for wild stocks as well as our objections to defederalization of the MFCMA.

INTRODUCTION

A critical impetus for enactment of the MFCMA was Congress' recognition that some fish stocks had been overfished, while others had been substantially depleted, because of increased fishing pressure and inadequate management practices. The MFCMA represents a national commitment to conservation of fish stocks to ensure that these resources are available to United States fishermen on a stable and continuing basis.

At the core of the MFCMA is its requirement that the regional councils or the Secretary of Commerce prepare fishery management plans that "will achieve and maintain, on a continuing basis, the optimum yield from each fishery." [1]* These management plans must be consistent with seven enumerated national standards for fishery conservation and management as well as with other provisions of the Act and other applicable law. These standards, when read as a whole, manifest a commitment to conservation of fishery resources, to prevention of overfishing, and to rebuilding of depressed stocks.

The MFCMA was a dramatic step forward for this nation's management of marine resources. As demonstrated by the record of the congressional oversight hearings, significant progress has been made in implementation of the MFCMA's objectives. Nevertheless, the oversight report also points out that institutional barriers to protection and restoration of anadromous salmon, particularly naturally spawning stocks remain. In general, those wild stocks are in a dangerously depeleted state and immediate action is necessary to ameliorate this threat.

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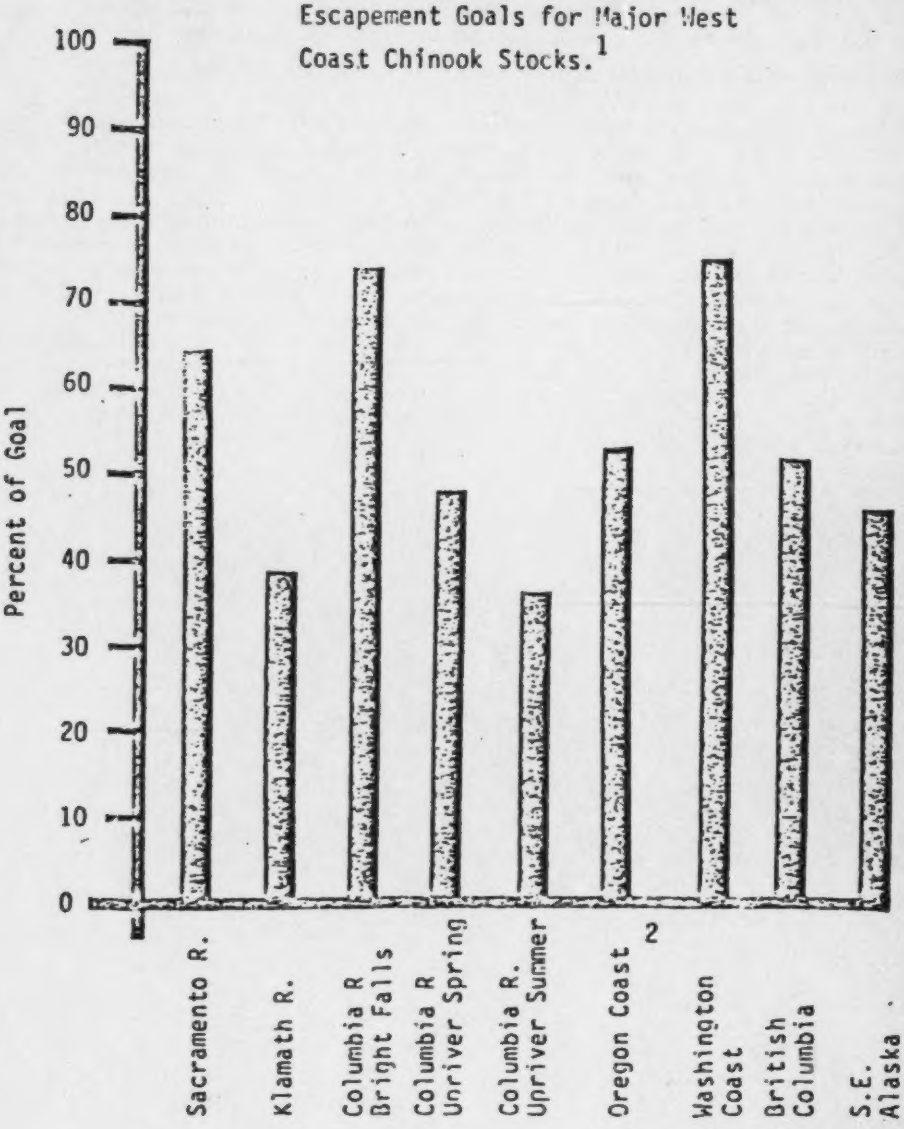
* Footnotes at end of statement.

A. The status of naturally spawning Pacific salmon stocks

A recently released study, prepared by fisheries biologists from state, federal, tribal and Canadian management agencies provides a dramatic illustrations of the seriousness of the threat to the continued biological well-being of wild Pacific salmon stocks. [2] That study describes the current status of both hatchery and natural chinook salmon stocks on the Pacific coast.

It points out that, overall, the condition of hatchery salmon stocks is not a conservation problem. Conversely, the biologists participating in this report concluded that most natural chinook stocks are achieving escapements far below optimum or even minimum goals. "In some cases escapements are continuing to decline while in others escapements have stabilized at very depressed levels. Improving escapements are the exceptions rather than the rule." While the study specifically addressed only chinook stocks, this bleak picture applies, in general, to all naturally spawning salmon stocks, coastwide, from California to Alaska. The enclosed chart demonstrates that salmon stocks are falling far short of their escapement goals on a coastwide basis.



Spawning Escapements Relative to Escapement Goals for Major West Coast Chinook Stocks.[1]

---

[1] Preliminary 1980 escapements except B.C. which is expected 1981 escapement

[2] Hatchery only.

The naturally spawning salmon stocks "form the backbone of the Pacific salmon fishery."[3] The genetic diversity of these wild stocks provides an invaluable pool that "enables the salmon resource to survive in a variety of environmental conditions."[4] In short, the genetic pool of the wild stocks provides a degree of biologic flexibility that ensures that the populations will survive and will perpetuate the species. So long as these stocks remain healthy, there is a reasonable probability of survival of some individuals under any of the range of environmental conditions normally encountered by the salmon populations. A failure to protect and enhance these stocks would represent an irrevocable loss of this genetic diversity.

In addition, these stocks represent a resource that is truly free. Management of these stocks does not require massive outlays of federal, state, and tribal funds to construct and operate extensive hatchery programs. So long as we have healthy natural stocks, no human intervention will be required to maintain this incredible renewable resource. If these natural salmon stocks are protected and restored, they will be available to commercial and recreational fishermen on a stable and continuing basis. Conversely, the future of hatchery stocks will depend upon Congress' annual appropriation of funds to operate hatchery programs—an issue that is by no means predictable.

B. The regional fishery management councils have not recognized the conservation needs of naturally spawning salmon stocks

The supplementary comments to the Merchant Marine Committee's oversight report on FCMA of Congressman Lowry illustrate that management of naturally spawning salmon runs presents problems of a special nature. The complexities inherent in management of these salmon stocks has made it difficult for the regional councils to implement those conservation and management measures needed to "rebuild, restore or maintain" the salmon fishery and which are designed to assure that "irreversible or long-term adverse effects on fishery resources . . . are avoided."[5] This points out the need to enact measures specifically designed to avoid the statutory barriers to effective conservation and management of salmon stocks.

Several reasons account for the inability of the regional councils to maintain and restore the naturally spawning runs. In the first instance, a broad array of fishery management agencies have engaged in a widespread effort to artifically produce salmon in hatcheries. This effort occurred without corresponding efforts to protect and enhance naturally spawning runs. As a result, the abundance of hatchery stocks has fostered intensive fisheries in the ocean while simultaneously obscuring the depleted state of wild runs.

In addition, the migratory nature of many salmon stocks makes coordinated, coastwide management difficult. The numerous management agencies that have temporary jurisdiction have been unable to apply consistent, coordinated management to this common resource. The comments of Congressman Lowry point out the deleterious effects of inconsistent management by the multitude of jurisdiction involved.

A third factor contributing to the decline of natural stocks owes to the regional council's decision to manage for strong hatchery stocks. Since the hatchery and natural stocks intermingle in the ocean, this management decision has a devastating effect on the natural runs. The management philosophy creates a vicious biological circle: as escapements decline, the natural stocks contribute progressively less to the overall ocean harvest, thereby making it even more difficult for ocean managers to take the aggressive conservation measures needed to restore the natural-hatchery balance in salmon fisheries.

The problems that confront protection and restoration of naturally spawning salmon stocks are surmountable. In the first instance, a curtailment of the Secretary's role in management of this resource should be carefully considered, since such a trend likely would not contribute to conservation of natural stocks. In any case, several amendments to the MFCMA, narrowly and carefully drafted, are urgently needed in order to provide the councils and the Secretary with the proper management tools to achieve conservation and restoration of naturally spawning runs. Unless the trend in escapements is halted and reversed, the nation will lose an invaluable resource.

C. Proposed amendments to the Magnuson Fishery Conservation and Management Act

Two bills to amend the MFCMA have been introduced in Congress, one in the House (H.R. 5002) and one in the Senate (S. 1668). A third bill drafted by the staff of the Commerce Committee, has been circulated for comment. We are concerned about the theme of decentralization that runs through each of these bills. Our concerns are discussed in this letter in a conceptual framework. We have included an appendix that specifically addresses our objections to particular provisions.

Briefly, these bills seek to limit the Secretary of Commerce's initial review of fishery management plans, or amendments, to a specified number of days. Unless the Secretary expressly disapproves a plan in whole or in part, the plan would be deemed approved. If the Secretary does disapprove the plan, his review upon resubmission must occur within a short time frame. In two of the bills the scope of his review is limited to certain criteria; if the Secretary fails to act, the plan is "deemed to comply" with at least some statutory requirements. In addition, these bills establish a parallel institutional process for preparation of regulations by the councils. These, and similar provisions, amount in essence to a strengthening of the councils' authority with a corresponding diminishment of the Secretary's role.

We have concluded that concentrating substantially greater authority in the regional councils, with a concomitant restriction of the federal presence in fishery management, is contrary to the best interests of the resource. This is particularly evident in light of the inability of the councils to implement effective measures to conserve and manage naturally spawning stocks. Further, the primary reason advanced for limiting the Secretary's role appears to derive from the Department of Commerce's tardiness in reviewing plans, amendments, and regulations. We believe the need for more prompt secretarial review can be satisfied without effecting a wholesale transfer of authority to the regional councils.

The national government has an important role to play within the MFCMA's two-tiered decisionmaking process, in which the councils and the Secretary perform distinct functions. The regional councils are designated the primary policymakers "vested with the authority to develop management plans that would dictate the fundamental objectives and methods of managing a given fishery. The Secretary, on the other hand, was given the role of reviewing the plans and of translating them into legally binding regulations." [6]

While this structure grants great deference to the councils, it also recognizes the role of the federal government. The ultimate responsibility for reconciling the disparate purposes of the MFCMA lies with the Secretary. Even if the proposed amendments are adopted, the ultimate authority will remain with the Secretary; yet the Secretary will be greatly restricted in his ability to ensure compliance with the national standards, with other provisions of the Act, and with other applicable law. The authors can identify no prudent reason for so circumscribing the Secretary's authority.

This conclusion is strengthened upon resort to the circumstances surrounding ocean management. The federal government, through the Departments of the Interior and Commerce, annually invests millions of dollars in promoting the salmon stocks. The federal government is intimately involved in efforts, coastwide, to protect the salmon resource and its freshwater environment. The federal government is burdened with a public trust to wisely manage the salmon resource for the benefit of the public. In addition, the federal government owes a fiduciary duty to Indian tribes with treaty-secured fishing rights.

On balance, the federal role is one of serving the broad purposes of the MFCMA. While its performance is not flawless, it is nevertheless important to retain the federal government within the fisheries management scheme. It is the indispensable participant that brings with it a national perspective and a long-range commitment to wise use. Further, the federal government is uniquely suited to ensuring this country's compliance with its foreign and domestic treaty obligations. Finally, no other level of government is capable of bringing order and coordinated management to fish stocks that migrate across a multitude of jurisdictional boundaries.

D. Modifications of the MFCMA are needed to protect naturally spawning stocks

The supplementary comments of Congressman Lowry demonstrate that aggressive conservation efforts must be undertaken to forestall the disaster course on which naturally spawning salmon stocks are embarked. Congressman Lowry's comments identified, from the oversight hearings, several factors contributing in substantial part to these problems. First, Congress has not made it sufficiently clear that state management was intended to be consistent with management in the fishery conservation zones. The critical problem of non-coordinated management would be resolved by enactment of an amendment carefully limited to salmon fisheries management. This amendment should provide that state agencies' management of salmon stocks is to be consistent with any applicable management plan prepared by a regional council.

Second, the regional councils often have failed to recognize and provide for the specific conservation needs of naturally spawning populations of anadromous fish.

An amendment to the MFCMA should be carefully formulated to require specific management measures for naturally spawning salmon stocks, without affecting the management of other fisheries.

[Addendum 1]

APPENDIX

The following is a more detailed assessment of specific provisions of the draft bill prepared by the staff of the Commerce Committee. We are hopeful that these comments will prove helpful both to the staff and the members of the Committee.

§ 6. *The guidelines required by section 301(b) of the Act shall not require mandatory compliance.*

It is important to note that the MFCMA requires that all fishery management plans be consistent with the seven national standards enumerated in section 301(b) of the Act. The purpose of the guidelines is to assist the councils in the development of plans and amendments. The guidelines represent the Secretary of Commerce's interpretation of the statutory mandate, on a practical level. The purpose is to guide the development of plans and amendments, as well as to ensure consistent treatment of fisheries among different councils. Consistency of management is especially important in the case of salmon stocks that migrate across a multitude of jurisdictional boundaries. The supplementary comments to the oversight report makes clear that greater consistency and improved coordination are needed. Denying the guidelines the force and effect of law will promote neither of those objectives.

§ 13. *Plans and amendments shall include proposed regulations.*

Two levels of analysis are appropriate with respect to this, and the following provisions. First, this amendment is unnecessary. Many of the councils already submit proposed regulations to the Secretary, in company with plans and amendments. Second, when viewed in conjunction with the provisions discussed below, this amendment constitutes a significant narrowing of the Secretary's authority and ability to implement the MFCMA.

§ 15. *As soon as possible after receiving a plan or amendment the Secretary shall review it for consistency with the national standards, other provisions of the Act, and other applicable law. If not disapproved within 45 days, the plan shall be deemed to comply with the criteria set out on paragraph 1.*

Again, this provision should be subjected to two levels of analysis. In expressly limiting the Secretary's review to 45 days, without consideration of the complexity, detail or controversy surrounding many plans, the bill creates a serious burden to good faith compliance by the Secretary. As noted above, this section, when viewed with sections 13 and 16 of the draft, represents an unwarranted narrowing of the Secretary's role, with a concomitant transfer of authority to the regional councils.

The need for expeditious review can be achieved through less draconian measures. The transfer of authority to the councils is not merited by their record in fisheries management. In addition, the presumption of compliance ("the plan shall be deemed to comply") raises grave questions about the Secretary's ability to participate in the development, and implementation, of plans. The most likely result of this provision will be a greater involvement on the part of the courts in reviewing plans that received inadequate review at the Secretarial level.

§ 16. *Immediately after the plan or amendment enters into effect the Secretary shall promulgate any regulations that are part of the plan or amendment.*

The objections raised above are equally significant here. It is the regulations that apply to and bind individuals and groups; it is the regulations that must be relied upon to implement a plan or amendment. It is especially important that Secretarial review be careful and searching.

In addition, section 13 of the bill provides that proposed regulations shall be considered part of the plan or amendment. This bill also repeals section 305(c) of the Act. When taken together, these provisions raise several serious questions. First, do these provisions implicitly withdraw the Secretary's authority to independently draft regulations? Second, does repeal of section 305(c) of the Act imply, that, in the absence of standards for Secretarial review of regulations, the Secretary is left only with the ministerial task of publishing a council's regulation?

Regardless, it is important to emphasize that a strong federal role in review of fishery regulations should be preserved.

§ 18. *State jurisdiction shall extend to pockets of waters adjacent to the state and totally enclosed by lines delineating the territorial sea of the United States.*

This provision is intended to resolve a real problem. However, it is also apparent that this provision would exacerbate the management of wild stocks off the coast of Southeast Alaska. In that area, the ocean fishery harvests significant number of wild stocks from the Columbia River, the coast of Oregon and elsewhere. Unless management of wild stocks within the territorial waters is consistent with management in the FC2, the conservation and management of wild stocks will be rendered significantly more difficult. Thus, the staff should consider exempting salmon stocks from the purview of this provision.

FOOTNOTES

1. 16 U.S.C. § 1801(b)(4).
2. "Generalized Chinook Stock Management Concerns," December 22, 1981.
3. Supplementary Comments to the Oversight Report on the Magnuson Fishery Conservation and Management Act of 1976 at 41 (1981).
4. Id.
5. 16 U.S.C. § 1802(2).
6. Rogalski, "The Unique Federalism of the Regional Councils Under the Fishery Conservation and Management Act of 1976," 9 Environmental Affairs 163, 177–78 (1980).

AMENDMENTS TO STAFF WORKING DRAFT 1

On page 12 insert the following at line 1:

Section 303 (16 U.S.C. 1853) is amended as follows:

(1) Subsection (a)(1) is amended by adding the following at the end thereof: "With respect to a fishery having species of anadromous fish, the conservation and management measures of the fishery management plan must be designed to conserve and protect the biological integrity of, and genetic diversity represented by, each naturally spawned population of such species originating in a specific river or lake. These measures shall include but are not limited to, standards for managing spawning escapements for each such population and the management of harvests consistent with such standards throughout its migratory range; provided however, that the preceding requirements of this clause shall not apply to a population if the affected federal, state, and tribal managers agree that the population should be so exempt, notify the appropriate council in writing of such agreement and the reasons therefor, which shall be set forth in the plan.

The following definitions shall apply in implementation of this paragraph:

(i) *Anadromous fish* means those species of fish (excluding cottids and lampreys) that are born in freshwater lakes or streams, migrate to the sea or large lakes, then return as adults to the lakes or streams of their birth to reproduce.

(ii) *Biological integrity* means the genetic characteristics of a given population that allow the greatest likelihood of survival under the specific environmental conditions associated with the location where the population reproduces.

(iii) *Genetic diversity* means the genetic differences between populations in a collection of genetically distinct populations of a species, where each population has become adapted to the specific environmental conditions associated with the location where it reproduces.

(iv) *Naturally spawning fish* means fish which, regardless of ancestry, spawn on a natural substrate without the need for significant human intervention.

(v) *Population* means a group of fish of the same species that spawn at the same time in the same lake or stream or part thereof.

On page 20 insert the following at line 5:

Section 306 is amended as follows:

(1) Subsection (a) is amended by adding at the end thereof the following new sentence: "Each state shall manage the fisheries within its jurisdiction consistent with any fishery management plan adopted under section 304 of this Act covering related fisheries or fish populations."

Johnson, Marceau, Karnopp & Petersen, Attorneys,
Bend, Oreg., April 8, 1982.

Mr. John Everett,
Staff, National Ocean Policy Study Group,
Commerce Committee,
U.S. Senate, Washington, D.C.

Re: Proposed amendment to FCMA providing protection for wild salmonid stocks.

Dear Mr. Everett: You may recall that at the March 31st meeting in the Commerce Committee Room involving you, Dennis Phelan and various tribal and conservation group representatives concerning FCMA reauthorization, you asked a question about the effect of the proposed wild stocks amendments. As attorney for the Warm Springs Tribe which supports statutory protection for wild stocks, I write this letter in an effort to provide a more detailed response to your concerns.

Your question was what would happen in the extreme case where a natural run had dwindled to a few hundred fish which intermingled in marine waters with large numbers of harvestable fish of the same species from healthy hatchery or other wild stocks. Would the proposed wild stock protection amendment require cessation of all marine fisheries which might incidentally harvest some of the remaining fish in the nearly extinct run? For two reasons, the answer is no.

First, in the extreme case hypothesized it is very likely that the affected federal, state and tribal fishery managers would concur that the miniscule natural run was nonviable and could not and should not be managed for in the ocean. The proposed wild stock protection amendment to the FCMA provides for just such an exemption.

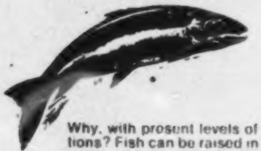
Second, the proposed amendment aims to protect the still viable but underescaped natural runs which constitute a small yet significant part of a mixed stock marine fishery. Contrary to the implication of your question, the proposed wild fish amendment does not mandate total closure of a mixed stock fishery to protect against any incidental harvest of underescaped natural stocks. While total closure is a measure that a Council and the Secretary may under certain circumstances choose to adopt, it is obviously an extreme remedy. The proposed statutory language does not mandate what the remedy must be, it simply requires that a plan or amendment take special cognizance of the wild stock conservation problem and include management measures directed to the problem. I expect that this provision would be satisfied in most instances by the adoption of a rebuilding plan featuring harvest restrictions applied over a number of fishing seasons with a projected incremental increase in escapement of the wild stocks. This is essentially the approach the NPFMC and the Alaska Board of Fisheries has taken with respect to the underescaped southeast Alaskan chinook salmon stocks, which are now on a fifteen year rebuilding schedule.

I am hopeful that the commercial fishing interests will understand that statutory protection for wild stocks is not an attempt to legislate a closure of the marine fishing industry. On the contrary, as wild stocks are heavy contributors to the commercial harvest, it is essential that these stocks be protected if the industry is to survive.

Thank you for your consideration of my somewhat tardy response to your question. Please do not hesitate to contact me if you would like to discuss this matter further or if you have any other questions concerning our position on FCMA reauthorization.

Sincerely,

Howard G. Arnett.



WHY WILD FISH?

Why, with present levels of fish culture technology, should we mainain wild populations? Fish can be raised in hatcheries, where juvenile survival rates are greater than in the wild, desirable traits can be selected for, runs can be manipulated . . . Are wild fish really necessary?

Anadromous salmonids have been occupying the Pacific coast from California's Salinas River north for about 10,000 years. The success of this occupation is reflected by the diversity of species, runs, and stocks into which salmon and steelhead have evolved. Each population has continued to adapt to the habitat it occupies, and by so doing, it survives. *adaptation is the mechanism of survival.*

Adaptation has been defined as "the development of genetically based traits that increase fitness." Fitness is the ability to survive under existing conditions. In a natural environment, where conditions are variable and demanding, an organism must constantly contend with predation and habitat instability while simultaneously competing for the fundamental necessities of food, shelter, and space. *Only the fit will survive.* By man's standards this process appears cruel, but it dictates evolution toward the ingenuity and durability required for long-term survival.

The process whereby an organism adapts to its environment requires an innate flexibility. Flexibility lies within the genetic material the organism is carrying. The greater the diversity of this material, the greater the probability that an adaptive response to environmental change will be available. *Genetic diversity, which enables adaptation, equates to survivability.*

Diversity in a population increases the probability that individuals capable of adapting to changing conditions will be present, which in turn increases the probability that the population will be perpetuated. Survival is thus an exceedingly slow but constant process of change in response to change.

A naturally propagating stock may appear to be operating inefficiently, but it is this slow constant change that allows the population to progress. Those that survive generally do so because they are fit to survive.

* * *

The purpose of a fish hatchery is, by and large, to improve on an apparently inefficient system — natural production — by producing greater numbers of fish in less space and shorter time. Hatcheries are valuable and necessary tools, but their limitations and those of the fish they produce must be recognized.

Hatchery fish can indeed fulfill the purpose for which they are intended: many fisheries today rely on them almost entirely. However, *supplying fish to a fishery and perpetuating a species are altogether different concerns.*

"Wild populations of salmon maintain adaptive genetic diversity through natural selection . . .." In terms of species perpetuation, the need for efficient short-term hatchery operation can diminish a population's genetic diversity through "unnatural" selection by man. Natural selection pressures are decreased by protecting the fish at each stage of the hatchery operation. Only a few adults need return to the hatchery to supply enough eggs to fill the incubation capacity. These few are selected primarily on the basis of "desirable" characteristics (e.g. size, time of return, overall appearance, etc.), and often without knowledge of their true worth in terms of perpetuating the population . . .. A large, well-formed fish may be pleasing to the human eye, but these traits do not necessarily indicate inherent adaptability and survivability.

Any portion of the returning run not required for hatchery production is considered surplus and is disposed of . . .. The genetic material of the "surplus" fish may thus be irretrievably lost to the population. If this process continues, a narrower and narrower genetic base will be used to maintain the population. Inbreeding will eventually occur, with all fish carrying the genetic material of only a few ancestors. Should environmental conditions change to select against that material, the population's survivability will be drastically, even dangerously, reduced.

Spawning, incubation, and partial rearing under controlled conditions do not diminish the need for genetic diversity. Once the fish are released from the hatchery, they must compete in an uncontrolled environment. Their survival, and ultimate contribution to the hatchery program, depend on their ability to do so. Production and release of larger numbers to offset the loss factor do not necessarily result in greater survival or larger returns to the hatchery.

The message is clear: *increased survivability of hatchery fish depends on the continued presence of wild fish.*

* * *

An organism's genetic material might be viewed as a collective racial memory of situations encountered and solutions arrived at in response. An organism that has encountered demanding situations, and has survived, is a stronger, more adaptable organism than one that has not been forced to do so. In a wild environment, an organism's only ally is its own ability to survive. In a controlled environment, man may be an ally in its quest for survival. If a controlled environment is suddenly replaced by an uncontrolled, the organism may continue to "expect" aid in a situation where the only aid available must come from itself. Such mistakes can be fatal, and this is perhaps the best proof of the importance of being fit in a system where survival of the fittest is an unbending rule.

* * *

In recent years, it has become obvious that hatcheries are not a panacea for severely depressed runs. A downward trend is becoming apparent in Columbia River salmon and steelhead landings between 1957-1979, all of which took place during a time of increasing hatchery releases into the Columbia system. This trend is not necessarily a direct result of those releases, but they have failed to reverse it.

The diminishing overall return that we now get for our efforts is strong evidence that we cannot afford to eliminate the adaptability and survivability that salmon and steelhead achieve through continuous exposure to natural selection pressures. And for this reason, all others aside, we cannot allow further loss or degradation of natural habitat, where natural selection pressures can function and natural production take place.

Why do we need wild fish? Because they survive. And in nature, survival is all that matters.

(Condensed excerpts from an article on natural production by CRITFC biologist Alex Heindl)

COLUMBIA
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INTER-TRIBAL
FISH
COMMISSION

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[Addendum 2]

TABLE 18.—ESTIMATED NUMBERS OF UPRIVER FALL CHINOOK ADULTS ENTERING THE COLUMBIA RIVER AND ESCAPEMENT, 1970–78

[In thousands]

Year	Commercial catch by zone			Bonneville adult count	Adult upriver run	Adult escapement
	1 to 5	6	1 to 6			
1970	142.1	34.8	176.9	159.7	301.8	124.9
1971	91.9	50.9	142.8	152.9	244.8	102.0
1972	94.4	39.0	133.4	94.2	188.6	55.2
1973	101.2	57.0	158.2	148.1	249.3	91.1
1974	51.7	51.1	102.8	125.2	176.9	74.1
1975	92.1	122.3	214.4	219.5	311.6	97.2
1976	31.7	121.5	153.2	228.7	260.4	107.2
1977	67.0	46.3	113.3	132.0	199.0	85.7
1978	(38.9)	(55.4)	(94.3)	144.9	(138.8)	(89.5)

TABLE 30.—ESTIMATED NUMBERS OF UPRIVER SUMMER STEELHEAD ENTERING THE COLUMBIA RIVER, ESCAPEMENT, AND PERCENTAGE OF THE RUN LANDED, 1957–78

[In thousands]

Year	Number landed by zone			Columbia River sport catch	Bonneville count	Upriver run	Escapement	Percentage run landed by zone	
	1 to 5	6	1 to 6					1 to 5	1 to 6
1957	91.6	0.2	91.8	....	138.0	229.6	137.8	40	40
1958	80.5	4.1	84.6	....	130.7	211.2	126.6	38	40
1959	103.0	0.8	103.8	....	128.6	231.6	127.8	44	45
1960	86.7	1.3	88.0	....	113.1	199.8	111.8	43	44
1961	89.2	1.5	90.7	....	138.7	227.9	137.2	39	40
1962	88.7	0.5	89.2	....	163.0	251.7	162.5	35	35
1963	100.4	8.5	108.9	....	128.4	228.8	119.9	44	48
1964	43.7	6.7	50.4	18.7	116.2	178.6	109.5	24	28
1965	41.6	13.2	54.8	20.1	165.6	227.3	152.4	18	24
1966	36.3	3.1	39.4	30.0	142.9	209.2	139.8	17	19
1967	25.9	15.8	41.7	21.4	120.0	167.3	104.2	16	25
1968	27.1	9.4	36.5	28.0	106.5	161.6	97.1	17	23
1969	21.3	14.1	35.4	11.3	139.3	171.9	125.2	12	20
1970	16.1	13.2	29.3	9.4	113.2	138.7	100.0	12	21
1971	20.6	25.7	46.3	10.8	193.1	224.1	167.4	9	20
1972	24.9	28.8	53.7	15.4	185.3	225.6	156.5	11	23
1973	22.7	26.8	49.5	8.5	156.6	187.8	129.8	12	26
1974	4.0	12.9	16.9	5.5	136.6	146.1	123.7	3	11
1975	[1] 0.0	7.0	7.0	0.0	84.1	84.1	77.1	0	8
1976	0.0	8.8	8.8	0.0	122.4	122.4	113.6	0	7
1977	0.0	31.4	31.4	4.4	191.7	196.1	160.3	0	16
1978	0.0	(15.6)	(15.6)	2.7	102.3	105.0	86.7	0	(15)

[1] Gill-net fishermen in Zones 1–5 are not allowed to sell steelheads.

Columbia River Inter-Tribal Fish Commission,
Portland, Oreg., May 4, 1982.

Hon. Bob Packwood,
Chairman, Senate Commerce Committee,
Washington, D.C.

Dear Senator Packwood: On behalf of the Columbia River Inter-Tribal Fish Commission, I would like to thank you for the opportunity to present testimony during hearings on the reauthorization of the MFCMA. As you know, this Act is important to all citizens of the Pacific Northwest and is of special interest to our member tribes which hold treaty rights to salmon stocks under MFCMA management.

During the hearing on April 30, you addressed two questions to witnesses which we would like to answer in further detail.

With regard to the question concerning defects in the current MFCMA Management Plans for salmon, conservation and user allocation of the salmon resource are two fundamental and interrelate problems under the MFCMA. Habitat degradation and overfishing have greatly reduced salmon stocks in the past 50 years, so that strict conservation is now required. How the conservation problem is resolved determines the annual harvest by all users. Within these two areas, the Pacific Fishery Management Council (PFMC) has developed the following management goals:

Providing for adequate spawning escapement;
Providing for allocation to treaty Indian fisheries;
Providing for allocation among ocean and inside fisheries;
Consideration of non-fishing participants (processors, consumers).

Compromise of primary obligations to "provide for spawning escapement," particularly for the large naturally spawning components of the fishery has made all other objectives ultimately unachievable.

For PFMC the 1981 draft plan identifies no major salmon stock which can be considered to be in optimal health. Alaskan chinook stocks are also severely depressed. All runs of upper Columbia River spring, summer and fall chinook are considered to be extremely depressed. Despite their condition, however, Columbia River chinook remain the largest component of the chinook population contributing to fisheries off of Washington, British Columbia and Alaska.

"Economic hardship" arguments consistently have been used to justify the continued high harvest rates of chinook by the offshore fisheries in the face of declining runs.

For example, with respect to the Klamath River:

[M]eeting the long term escapement goal of 115,000 adult fall run chinook in the Klamath system would be difficult to achieve in 1981. The adoption in 1981 of measures to meet the long term goal would contribute to servere economic disruption of the ocean fishery, and coupled with last year's (1980) low prices (when compared to 1979) paid to trollers, would undoubtedly result in economic disaster to many fishermen." (p. 6–IV, 1981 Draft Salmon Plan, PFMC)

Similarly, the plan states that achievement of long term escapement goals in 1981 for upper Sacramento fall chinook—

"Would require the imposition of additional severe restrictions on the troll fishery, with consequential severe ecomonic impact on the ocean troll fisheries." (p. 9–IV, 1981 PFMC Draft Salmon Plan, PFMC)

The 1981 Draft Plan repeatedly states that for the Columbia River, and many other stocks, meeting spawning escapement goals would be difficult to achieve due to the socio-economic impacts on the fishing industry. These arguments totally ignore the severe decline of naturally produced runs on these rivers and does not adequately address the management goals as developed by the councils.

Management cannot continue to bankrupt the resource in order to alleviate the particular short-term economic problems facing the ocean fishing industry, especially because council actions must inevitably mean long-term bankruptcy for all fisherman. The problems which were once described as "short-term" have escalated to long-term crises for many Oregon, Washington, Idaho, and Alaskan salmon stocks. *In the face of declining run sizes of naturally produced salmon, the lack of sufficient fish for spawning only postpones the inevitable necessity of even more severe reductions in catch in the future.*

Actions of the regional councils fail to recognize that naturally produced chinook stocks along the entire Pacific coast in general and the upper Columbia River in particular are in a depressed condition. Insufficient numbers of spring and summer chinook stocks have escaped into the Columbia River in recent years to provide for adequate spawning escapement, and the fall chinook runs are also at a dangerously low and depressed state.

These are major stocks of salmon, which should receive affirmative management. The list of PFMC identifed stocks are as follows (PFMC, Mar. 1982):

Natural spawning stocks

Puget Sound: Fall chinook, Coho.
Washington coast: Fall chinook, Coho.
Columbia River: Upriver fall chinook, *Upriver spring chinook, *Upriver summer chinook.
Oregon Coast: Chinook, Coho.
*Klamath system: Chinook.
Sacramento system: Chinook.

Hatchery stocks

Puget Sound: Chinook, Coho.
Washington coast: Chinook, Coho.
Columbia River: Chinook, Coho.
Snake River: *Chinook.
Oregon coast: Chinook, Coho.
OPI: Coho.
*Klamath River: Chinook.
Sacramento River: Chinook.

Of these 23 stocks, 11 are naturally produced, and 12 are hatchery produced.

After four years of management (1977-1980) under the MFCMA three of the hatchery stocks remain over 30 percent below escapement goals (asterisks), and three of the natural stocks remain over 30 percent below escapement goals (asterisks).

Only nine of the stocks have met or exceeded the 1977-80 goals as formulated by the council. A summary report of PFMC performance (Mar. 1982) concludes:

"In many cases, escapements increased or were relatively constant at levels which met or exceeded the goal. In some cases escapements continued to decline and were below goals or were constant at levels below the goal; this is true for natural spawning escapements of upper Columbia River spring and summer chinook and Klamath River fall chinook, and for hatchery escapements of Washington coastal fall chinook, Snake River spring chinook and Klamath fall chinook. In addition, other areas showed improvement but escapements still were below goals in 1980. Included in this category are natural spawning escapements of Washington coastal chinook and coho and hatchery escapements of Puget Sound fall chinook. Puget Sound, Washington coastal, and upper Columbia spring and summer chinook are not considered to be major contributors to fisheries under Pacific Council control."

However, it is simplistic to assert that the Alaskan or British Columbia fisheries are responsible for the lack of sufficient fish returning to the streams. If the council is indeed convinced of this conclusion, we are compelled to ask why there has been no coordination between the two Commerce Department management councils (NPFMC and PFMC) to identify conservation requirements and harvest rates in their respective fisheries. We have seen virtually no planning or implementation of measures necessary to achieve conservation goals by either council, despite the obvious need to do so.

With regard to your question concerning the impact of ocean fishing regulations on naturally spawning stocks of the Columbia River, we believe that Oregon Department of Fish and Wildlife Director Donaldson erred when stating that steelhead and sockeye runs have suffered declines comparable to chinook runs due to hydroelectric development despite the lack of ocean fisheries for these stocks.

The decline of the sockeye salmon in the Columbia River is attributable to environmental degradation caused by hydroelectric development. However, this species has also never received the benefit of artificial enhancement or mitigation to make up for the loss of runs due to dam construction. There are currently no hatcheries for sockeye on the Columbia River; therefore, all production is from self-sustaining wild stocks. Despite this lack of artificial enhancement, the run has maintained a declining but somewhat stable population in recent years. Sockeye have declined 36 percent since the 1971-75 base year average. They are not harvested by ocean fisheries.

Steelhead, which are also not harvested by offshore fisheries, have had the benefits of artificial enhancement and have maintained and increased in population in recent years. Steelhead are currently the strongest run of salmonids in the Columbia River, despite environmental degradation and hydorelectirc dam impacts comparable to other salmon species. The overall decline in steelhead has been only 8 percent since the 1971-75 base period.

Chinook salmon (spring, summer and fall races) all have substantial hatchery supplementation, have suffered from extensive environmental degradation, and support large ocean fisheries on the west coast. Compared to the 1971-75 base period, spring chinook have declined 61 percent; summer chinook have declined 43 percent and fall chinook have declined 33 percent.

We conclude that ocean harvest of chinook is a major contributing factor to the decline in current chinook populations, based upon comparisons with declines in sockeye and steelhead populations, which are not harvested by ocean fisheries.

The attached figures graphically show in-river run sizes for the above salmonids (numbers of fish entering the river) for the years 1970-81.

In-river fisheries for sockeye, spring or summer chinook have been curtailed or eliminated in recent years in response to conservation requirements.

It has come to the attention of the commission that staff of the Oregon Department of Fish and Wildlife have contacted signatories to the letter submitted to you concerning wild salmon stock protection under the MFCMA that we requested to be included in the hearing record. They have stated that such an amendment would give Indian tribes "veto power" over salmon management.

What is proposed in the appended document entitled "Amendments to Staff Working Draft 1" is that naturally spawned populations of anadromous fish be considered and protected under the MFCMA *unless affected* federal, state and tribal managers *agree* that the population should be exempt. The purpose of the amendment as understood by the commission is that decisions to *not* consider and protect naturally spawned stocks be made in a direct and open manner rather than by inaction and neglect as has been the case with naturally produced runs on every major river on the west coast. (See attached letter to Mr. Everett).

It is imperative that tribal managers be included in such a decision. As you are surely aware, the Columbia River treaty tribes exercise management responsibilities including fish production, habitat protection, harvest management and enforcement on certain stocks which are destined to pass their usual and accustomed fishing places. This is an element of the right of self-government secured by treaty and affirmed by numerous federal court decisions. In addition, the Columbia River treaty tribes and other treaty fishing tribes have a vested property right in treaty-secured fish runs. Thus any decision to permit the extinction of naturally produced run subject to treaty allocation is one that violates the treaties and is subject to the requirement of compensation under the Fifth Amendment to the U.S. Constitution.

Both *U.S. v. Washington* and *U.S. v. Oregon and Washington* affirmed the rights of affected treaty fishing tribes to meaningful participation in management of fisheries subject to treaty allocation, and, in this regard, the commission participates as members in numerous management committees. Therefore, any decision to not protect a naturally produced population of salmon should include the participation and agreement of affected tribal fishery managers.

Again, thank you for the opportunity to testify on this important matter and to insert these materials into the record. If we can be of further assistance, please do not hesitate to call.

Sincerely,

S. TIMOTHY WAPATO,
Executive Director.

The CHAIRMAN. Mr. Culpus.

Mr. CULPUS. Mr. Chairman and members of the committee:

My name is Harold Culpus. I am a member of the Warm Springs Tribal Council and chairman of the Columbia River Tribal Fish Commission, an organization made up of various tribes which have treaty fishing rights on the Columbia River and its tributaries. I am here today to urge the committee to approve amendments to the FMCA which will provide a special protection for naturally produced salmon stocks.

There are two types of salmon in the Pacific Northwest salmon fisheries, hatchery fish, and wild fish. In ocean fisheries regulated under the FCMA, the hatcheries and wild stocks are mixed together. The practice has been to manage for the strongest stocks because increased hatchery production in recent years has provided more harvestable salmon for the ocean fisheries.

Wild stocks have been overharvested in an effort by ocean trawlers to catch every last available hatchery fish. This approach to ocean fisheries management is shortsighted biologically and economically. If it is continued, inside fisheries such as the fisheries on the Columbia River will be eliminated, the substantial contribution of wild stocks to the ocean harvest will be reduced to a mere nothing.

The cost of maintaining the ocean fishery with more hatcheries would be tremendous. It is in everyone's interest to protect wild fish, naturally produced salmon, a major part of the ocean harvest.

In just one fishery alone, the Southeast Alaska Ocean Troll Fishery, the wild Columbia River is the largest contributing stock right now. The wild fish in the Southeast Alaska Ocean Troll Fishery are being overharvested. If we do not protect these wild stocks, it will be the end of the ocean fishery, which is the major industry in southeast Alaska.

We are not asking for legislation which will shut down ocean fisheries. We are simply asking that Federal ocean fishery management be required to take into account the depressed condition of almost all natural stocks contributing to the ocean fisheries.

We must reverse the philosophy of managing for the runs with the most available fish harvest. We must protect the natural runs, which cost nothing to produce and have genetic diversity to withstand quick changes in marine environment. We must return wild salmon to their proper role as the foundation of the Pacific salmon fishing industry, both in the ocean and in the terminal areas.

The wild fish amendments of the FCMA will accomplish these purposes. We urge their adoption.

And thank you for your attention.

[The statement follows:

STATEMENT OF HAROLD CULPUS, MEMBER, WARM SPRINGS TRIBAL COUNCIL, ON BEHALF OF THE COLUMBIA RIVER INTERTRIBAL FISH COMMISSION

Mr. Chairman and members of the Senate Commerce Committee, my name is Harold Culpus and I am accompanied by Johnson Meninick, chairman of the Tribal Council of the Confederated Tribes and Bands of the Yakima Indian Nation. Our tribes as well as the Nez Perce and Umatilla tribes founded the Columbia River Intertribal Fish Commission as an agency for the purpose of cordinating our tribes' fishery activities where appropriate and supplying our tribal governments with technical expertise where requested. The Commission itself is composed of the fish and wildlife committees of the four Columbia River treaty tribes.

Since the passage of the MFCMA in 1976 both the Commission and our tribal governments have monitored ocean fishery management under the Act and supplied extensive input to both the Pacific Fisheries Management Council and the North Pacific Management Council as well as the Secretary of Commerce. The focus of our participation was to insure that our fisheries, which are guaranteed by the United States by treaty, were protected and perpetuated. Because tribal fisheries on the Columbia are located in the upper reaches of the river and its tributaries above Bonneville dam, any fishery below ours which takes upper river stocks affects both our fishery and the spawning escapements necessary for perpetuation of the salmon themselves. In additon, hatcheries and natural habitat in our reservation and ceded areas produce these fish. Therefore, it is both necessary and appropriate that our tribes watch over these fish from the time they are eggs in the gravel to the time they return from the ocean to spawn new generations and die.

What we have seen since 1976 is that the Councils and the Secretary of Commerce are allowing the naturally-produced salmon runs of the Columbia and its tributaries as well as the salmon of every major west coast river to decline to a point where spawning escapements necessary for perpetuation are not being met. While we have seen some interest on the part of the Secretary after four years of lawsuits against his office, we still see the Councils ignoring the status of naturally-produced runs while the ocean fishery is managed to take full advantage of hatchery production. This weak link of ocean fishery regulation is used by other water users who share responsibility for decline of salmon runs as an excuse to aviod action with the aim of protecting, mitigating and restoring these imperiled runs.

Recently, the Pacific Northwest Electric Power Planning Council (PNEPPC) established under the Pacific Northwest Electric Power Planning and Conservation Act (Public Law 96-501) held hearings to determine how it would carry out its responsibilities to rehabilitate Columbia River fish runs in accordance with Section 4(h) of the Act. In speaking for the Pacific Northwest Utility Conference Committee, Dr. Don Chapman, a fisheries consultant, analyzed the condition of Columbia River salmon and reached the conclusion that the ocean fishery was about equally responsible for the condition of Columbia River salmon. His argument was raised against the goal of state, federal and tribal fishery agencies to increase the number of returning adult salmon to the upper river areas which are now laced with utility and federal dams. And his logic is difficult to dispute: why should utility ratepayers invest hundreds of millions of dollars in the protection, mitigation and enhancement of Columbia River salmon if the spawning escapements for naturally-produced stocks are not met because of ineffective ocean fishing regulations?

Dr. Chapman's report to the Power Council stated further:

"Coastwide concern has been expressed concerning the status of a number of chinook runs, including those without dams and affected primarily by fishing. The North Pacific Fisheries Management Council (1977) states: *'It appears that the major reason for population declines in Southeast Alaska chinook is due to overharvest.'* "

And that overharvest continues because the MFCMA does not prohibit overharvest of stocks on a continuing basis.

Dr. Chapman's report states further:

"In December, 1981, twenty-one United States Agency scientists, Indian Tribal delegates and one Canadian scientist met in Seattle to discuss the status of the resource. 'Some excerpts from their report (Anonymous, 1981): The condition of natural stocks, particularly for several major producers, is by-in-large severely depressed coastside . . .' 'A general consensus was reached that major natural chinook stocks, on a coastwide basis (Columbia River to Cape Suckling, Alaska) are still viable but are currently achieving escapements which are far below optimum or even minimum goals. In some cases escapements are continuing to decline while in others escapements have stabilized at very depressed levels.' 'Major infusions of money for new hatchery production is unlikely and may not be desirable. The only effective action available is to further reduce total harvest rate.' . . . 'A general consensus was reached that, due to the severe conservation challenge confronting us with natural stocks, significant catch reductions in ocean fisheries will be required to even halt the decline in chinook spawning escapements, much less begin the rebuilding process.'"

Currently, negotiations continue with Canada for the purpose of reducing interceptions of United States salmon stocks. It is unlikely that an acceptable solution to these long-term negotiations will be reached as long as ocean overharvest remains one of the two major contributors to the decline of natural salmon production and as long as U.S. law does not require the specific conservation of naturally-produced stocks of salmon in fishery management regulations.

Inherent in the "stock concept" of Pacific salmon management is the fact that salmon do not behave as a homogenous unit. In the multi-species, multi-stock variation of Pacific salmon, there are hundreds of rivers producing stocks of varied population dynamics and genetic characteristics. The genetic diversity of these stocks and its importance can not be overstated. Based upon experience with agricultural and husbandry endeavors, variability is a source which permits the maintenance and improvement of healthy stocks. Destruction of natural stocks of salmon results in the loss of genetic information, lowered resistance to disease, and reduced fitness in coping with changes in the natural environment. A good example of this latter point was the resilience demonstrated by stocks from the Toutle River in Washington which was blocked by mudflows from the Mt. St. Helens eruption. While the hatchery involved was destroyed, many of the Toutle River naturally-produced steelhead moved to habitat on the adjacent Lewis River which had not suffered damage from the eruption and spawned there.

If the problems of overharvest associated with the mixed-stock ocean fishery are not solved, there is the real possibility of driving the natural stocks of the upper Columbia River and its tributaries to extinction. This would not only spell disaster for all of the fisheries which depend on these stocks including both the ocean fishery and especially inside fisheries on the upper river, but it would also result in a marginal biological condition of decreased genetic diversity and a consequential lowering of overall production.

Hatcheries were constructed as a means to supplement declining fish populations which had suffered from environmental damage and they are expensive propositions. Naturally produced runs, on the other hand, can be self-sustaining runs which are able to reproduce themselves and contribute to the fisheries on a continuing basis at no cost.

By managing for both hatchery and natural production, the fishing resource is made more durable. It is the goal of the Columbia River treaty tribes and many other fishery and conservation organizations which signed the letter of April, 1982 to Senator Packwood, that the FCMA give full consideration to the needs of natural and hatchery produced fish so that a durable fishery is created once again in the Columbia River and in related ocean fisheries. We understand that such a management regime may require significant changes in agency policy, but the cost of these damages is infinitesimal when compared to the loss of our Pacific Northwest salmon stocks.

At present, virtually all inland salmon fisheries are primarily managed by state and tribal management agencies on the basis of the health of returning runs of natural fish. While these fisheries usually have substantial hatchery runs as well, the fishery is ultimately controlled and regulated on the basis of the natural run strength, regardless of the often surplus hatchery run.

On the other hand, the regional fishery management councils have not paid necessary attention to the biological value of spawning population when managing the ocean fisheries. The result is inconsistent management of fisheries, and accelerating decline in natural production, as these stocks are harvested in the ocean at a rate comparable to hatchery fish and therefore fail to return to their home rivers in sufficient numbers to perpetuate themselves.

The disparity in regulation which results from this condition creates difficult political problems for inside fishery managers. Often large surpluses of hatchery fish return to the rivers and are not available to the inland fishery because of concurrent returns of weak natural stocks. The definition of conservation is inconsistent between inside and outside management entities which makes management efforts extremely difficult and often discriminatory.

Ocean fisheries should be managed consistent with the need to protect the natural component, which is unquestionably important to the maintenance of fisheries. However, the lack of a statutory mandate to conserve naturally-produced stocks has made it difficult for regional councils and the Secretary of Commerce to prepare the regulations for fisheries requiring such conservation. The presence of a statutory mandate would permit viable natural salmon stocks to be increased so the proportion of these fish in the mixed stock fishery is comparable to the hatchery component, thereby allowing increased harvest opportunities for all fisheries in the long term.

In addition, a congressional mandate would encourage consistency of federal and state regulations. Currently, for instance, we have seen a prime example of inconsistent regulations affecting salmon stocks of the Columbia River, as the fish travel through 5 state jurisdictions, 2 regional management council jurisdictions, and 2 countries. A lack of management consistency causes fishing effort for these migratory stocks to be focused in areas where regulations are less stringent, thereby defeating the intent of conservation efforts taken in other areas.

While the system of regulation established by the MFCMA has resulted in an increased ocean catch by U.S. fishermen relative to foreign fishermen, the system established under the MFCMA has had the negative effect of insulating the ocean fisheries from the conservation provisions of the Act and from the need to allocate shares of Pacific salmon stocks to spawning escapement and inside fisheries. The inside fisheries, despite their relative efficiency as salmon harvesters, have been forced to bear a substantial and disproportionate burden of conservation. Even with increasingly stringent inside management, including extensive closures, in an increasing number of cases not enough fish have returned to meet even minimum escapement requirements.

Whether or not intended, the effect of the MFCMA on west coast salmon stocks has been the failure to protect the substantial naturally-produced components and increased reliance on hatchery stocks which were developed to supplement wild stock production. This effect and the need for adjustment are clearly established; in order to protect these creatures which are of inestimable value to the Nation and to carry out the solemn obligations agreed to by the United States in our treaties, the Columbia River Intertribal Fish Commission and its member tribes strongly recommend that you adopt amendments to the MFCMA which will protect viable stocks of naturally-produced stocks of salmon and insure consistency for the conservation of these fish in U.S. waters.

The CHAIRMAN. Thank you, sir.

Mr. McMinds.

Mr. McMINDS. Thank you, Mr. Chairman.

I just want to abbreviate my testimony. I will follow the usual course here today. I want to stress the importance of the action Congress took when it passed the FCMA. In passing the FCMA they recounted several general concerns.

Congress was concerned about overfishing by the foreign and domestic fleet. It was concerned about the lack of management coordination among the many managers that exist in Alaska, the States of Washington, Oregon, California, and Idaho, and the international concerns with Canada as well. Those concerns could not be addressed in domestic legislation, however.

Congress was concerned about the lack of adequate conservation and management measures to insure the perpetuation of the various runs of fish. It was concerned about habitat and protection of habitat so that we could have fish runs in the future.

These are the concerns I want to address. I want to address them in terms of the protection of the—in the conservation sense and the preservation of the various runs of fish in our areas. I want to address them in the development sense, and that development sense leads us to wise use concepts that are developed to enhance our resources and make better use of the management regimes that we established among the various entities.

I feel that we have to address our concerns—that is, the tribal concerns—within this context, and that our three major concerns are so interrelated and intermeshed that they really lead toward a much better management regime. I want to share these three major concerns with you by amplifying the discussion this morning on wild stocks, and by asking the Congress of the United States and the people who supply the money to run the fish hatcheries: What is going to happen to the fish run when the people who appropriate money decide that hatcheries are no longer feasible, economically feasible? What will then happen to the Columbia River, the coast of Washington, Puget Sound and other areas that rely heavily on hatchery production?

The CHAIRMAN. Let me interrupt just to correct your statement. You said, "when the people who appropriate the money", which is us, "decide that hatcheries are no longer feasible." However, I am not sure we agree with the philosophy of those who are asking for the present budget, which is the administration.

Mr. MCMINDS. Well, we certainly are supporting appropriations to continue hatcheries. But we often wonder how the general public will react to expenditures in the Northwest. When we lost the very influential chairman of the Appropriations Committee last year, we were lucky to get a replacement such as you for that committee so you could assist us in these efforts. We know that we will be in very capable hands with your help.

Nevertheless, the question still exists—and I will emphasize this again, Mr. Chairman, by saying that there has been some discussion that, if the money is not available, made available, we would assess the ratepayers in the Northwest to continue the hatchery programs in that area. But we have kind of a double whammy there, too. The ratepayers are rebelling against the current rates in the Northwest.

So our bottom line is, Mr. Chairman, there has to be a management regime developed and coordinated among all of the managers, one that allows the continued existence of wild stocks to give us the insurance policy we need for economies that are just bursting right now. I cannot emphasize this any more strongly than to say, we feel that we need that insurance policy, we need that protection in legislation, to enable that insurance policy to exist.

Now, that is not to say, Mr. Chairman——

[The statement follows:]

Statement of Guy R. McMinds, Northwest Indian Fisheries Commission

Mr. Chairman, members of the committee, I am Guy R. McMinds. I am here today representing the Northwest Indian Fisheries Commission and its twenty member tribes on Puget Sound and the Washington coast. I am also Commissioner for the three tribes of the Quinault Treaty Area along the Washington coast, and a member of the Quinault Indian Nation. I represent the Northwest Indian Fisheries Commission and its member tribes on matters concerning salmon management off the Pacific coast, including management and regulation under the Magnuson Fishery Conservation and Management Act.

We appreciate the oppportunity to participate in these hearings to consider amendments to the Act. As fishery managers of many of the salmon resources which migrate back and forth into the fishery conservation zone (FCZ), we are also deeply concerned with an affected by management under the Act. Together with the Regional Councils established under the Act and several of the other affected managers, we believe this is an appropriate time to consider amendments to strengthen the Act and to improve the conservation and management of the Nation's fishery resources.

The Magnuson Fishery Conservation and Management Act (MFCMA) was enacted because the Congress was deeply concerned about the depletion of important fishery resources off the coasts of the United States. Overfishing by foreign and by domestic fleets, the lack of coordination between fishery managers and the absence of adequate conservation practices and management controls, as well as adverse environmental changes to the fishery habitat, had contributed to the decline of such important resources as our wild Pacific salmon runs. It was a primary purpose of the MFCMA to initiate strong conservation and management measures to protect these resources so they would continue to exist and would regain strength to support healthy domestic fisheries, including the treaty right salmon fisheries of the Northwest Indian tribes.

The conservation and management of Pacific salmon, and particularly the wild (naturally spawning) runs, is especially important to the Northwest Indian tribes because it is these runs that are and always have been the foundation of the cultures and economies of our tribal fishing societies. We are disappointed that the management system established under the Act has not yet been successful in achieving these goals, but we believe they can and should be achieved. Therefore, in addition to commenting on the draft amendments prepared by the Committee staff, and commenting briefly on S. 1668, we will suggest a few amendments that we believe are very important to significantly strengthen the present system of Regional Council management and to help finally achieve the original purposes of the Act.

In general, we believe the Senate staff working draft represents the best and most concise of the MFCMA amendment proposals currently before the Congress. It includes everything of any importance addressed by S. 1668 but, unlike many of S. 1668's provisions, the staff amendments are framed in a constructive way to improve Regional Council management. We strongly urge the Committee to reject S. 1668, and to work with the Commerce Committee staff draft amendments as the basis for any Committee action. While the language proposed in S. 1668 would require major corrective changes and rewrite, our problems with the staff draft amendments are small, and can easily be corrected without changing their positive thrust.

Our major problems with all of the proposed amendments are in the omission of amendments which we think are most important to improve the effectiveness of the Regional Council process and the Act itself. It is these omissions to which we will first address our comments.

PROPOSED ADDITIONAL AMENDMENTS

We have reviewed the Act carefully to determine what additional amendments should be adopted by the Congress to strengthen the ability of the Regional Councils to achieve the conservation and management mandates of the MFCMA. In this process we have identified three areas where such amendments are needed. These have to do with (1) the assurance of consistent regulation by states of fishery resources that migrate between the waters of various states and the FCZ; (2) appropriate representation of Indian tribes in the regional Councils; and (3) clarification to assure that the wild runs of anadromous fish will be protected under fishery management plans developed by the Regional Councils.

Protection of wild runs of anadromous fish.—This area of concern is a most serious one. Anadromous species of fish, and especially the naturally spawning runs of such fish, are important along both coast lines of the United States. It is the naturally spawning populations of such fish that serve as the backbone for the fisheries that harvest these fish, but too often greater attention has been given to the hatchery runs that mix with these wild runs. Since the hatchery runs often can be harvested at a higher rate, there has been unfortunate overfishing of and injury to some wild runs, such as the Columbia River upriver chinook runs, as well as the failure to meet designated spawning objectives for many other natural runs. In the process, both conservation and other legal obligations, such as allocations to treaty Indian tribes, have received short shrift in respect to the naturally spawning anadromous fish runs.

Given the great importance of these runs to the fisheries that participate in their harvest, Indian and non-Indian, commercial and recreational, it is essential that the availability and survival of these natural runs be ensured. We believe that clarification of the Congress' intention with respect to protection of naturally spawning runs of anadromous fish as an objective of the MFCMA's conservation and management goals is important to ensure the effective recognition and protection of these great National resources. For this reason, we request that the Committee provide an amendment to Section 303(a)(1) of the Magnuson Fishery Conservation and Management Act, to add a new clause (D), as follows:

"(D) With respect to a fishery having species of anadromous fish, the conservation and management measures of the Fishery Management Plan must be designed to conserve and protect the biological integrity of, and genetic diversity represented by, each naturally spawning population of such species originating in a specific river or lake. These measures shall include, but are not limited to, standards for managing spawning escapements for each such population and the management of harvests consistent with such standards throughout its migratory range; *provided*, however, that the preceding requirements of this clause shall not apply with respect to a population if the affected Federal, State, and tribal managers agree that the population should be so exempt, notify the appropriate Council in writing of such agreement and the reasons therefor, and such reasons are set forth in the plan."

Such an amendment would be consistent with the original intentions of the Act, and would ensure the additional protection needed to avoid the loss of valuable resources that, once lost, cannot be replaced without a great expenditure of public funds.

We believe this amendment is the most important of all of the amendments which you have before you since it is the only amendment that can provide a real assurance that these important anadromous fishery resources survive to the continuing benefit of all fisheries.

Consistent regulation by states within state jurisdiction.—An unfortunate pattern of aberrant state regulation of Pacific salmon fisheries has developed along the Pacific coast, affecting the work of both the Pacific Fishery Management Council and the North Pacific Fishery Management Council. The inconsistent state regulated fisheries have substantially impeded the ability of the Regional Councils to comply with the conservation mandates of the MFCMA, and "other law", including Indian treaty fishing rights, particularly for the wild runs of Pacific salmon. This problem has occurred every year since the enactment of the MFCMA.

A prime example of the problem may be found in the 1980 and 1981 pre-PFMC salmon season in effect in the State of California within three miles off its coast. This early opening, we understand, is being considered once again by California for this year's season. The California actions affect coho salmon runs in need of protection, destined for the Oregon and Washington coastal streams, as well as the depressed Klamath River chinook runs, frustrating the efforts of the PFMC and those states to comply with the law. Similar problems have been caused by the actions of the State of Oregon which, in each of the past two years, and again this year for the 1982 fisheries, has enacted regulations for its offshore fisheries inside three miles of its coastline that seriously conflict with the regulations adopted by the PFMC for the same fishery resources. This situation causes serious conservation and allocation problems for the other Regional Council, state and tribal managers, and can prevent the achievement of legal obligations such as compliance with Indian treaty rights, as well as other goals and obligations of the Regional Councils.

Although the Act gives the United States exclusive management authority over "all anadromous species throughout the migratory range of such species beyond the fishery conservation zone . . ." (Title I section 102; 16 U.S.C. 1812(2)), the procedure established under the Act to enforce consistent regulations by the states is so time consuming and cumbersome as to make it wholly ineffective. (See Title III, section 306; 16 U.S.C. 1856). If the Act is to be effective at all in enforcing its regionalized approach and coordinated management objectives, and in achieving its conservation purposes, without requiring further amendment of the Act to facilitate preemptions, the states cannot think they can continue their current practices. The states must be reminded that a primary purpose behind the MFCMA is to insure consistent management and conservation of fishery resources of value and importance to the Nation. Therefore, we strongly urge you to consider an additional amendment to Section 306(a) of the MFCMA, to add to the end thereof a new sentence to read as follows:

"Each state shall manage the fisheries within its jurisdiction consistent with any fishery management plan adopted under Section 304 of this Act covering related fisheries and fish populations."

We believe that this simple addition of a sentence will give needed emphasis to the intent of the Act to provide for consistent regulation of fishery resources migrating between waters under state jurisdiction and the fishery conservation zone, encouraging the states to respect the Regional Council decisions in which they participate.

Representation of Indian tribes in the Regional Councils.—Although by law and in practice the treaty fishing tribes of the Northwest are co-managers of the Pacific salmon resources, they are the only fishery managers whose participation on the Regional Councils is not required by law. We believe that this oversight ought to be corrected by an amendment which formalizes tribal participation in the Regional Councils' decision-making. We suggest that this be done by amendments in three places. Section 302(b)(1)(C) of the MFCMA should be amended to read as follows:

"Representatives of Indian tribes with established fishing rights affected by that Council's fishery management plan(s) shall be appointed by the Secretary from a list of qualified individuals submitted by the applicable Indian tribes. The other members required to be appointed by the Secretary shall be appointed by the Secretary from a list of qualified individuals submitted by the governor of each applicable constituent State . . . (continuing as presently framed in the Act)."

Section 302(g)(1) should be amended by adding to the end thereof the following new sentence:

"Each such committee shall include appropriate representation of the states and Indian tribes affected by that Council's fishery management plan(s)." and by adding to the end of paragraph 302(g)(2) the following new sentence:

"Each such other panel (or team or committee) shall include appropriate representation of the states and Indian tribes affected by that Council's fishery management plan(s)."

While some of the tribes do now have some representation on Regional Councils responsible for Pacific salmon resources, the lack of required representation leaves tribal participation in Regional Council processes entirely to the winds of the politicians responsible for such decisions at any given time. We believe that the formal correction of this original oversight in the Act would prevent this from becoming a problem in the future.

COMMENTS ON S. 1668

We have carefully reviewed S. 1668, as well as the proposed amendments prepared by the Senate Commerce Committee staff and the amendments presently being considered by the House Merchant Marine and Fisheries Committee. We will, however, keep our comments on S. 1668 very brief. We believe that the amendments prepared by the Commerce Committee staff by far strike the better balance between these drafts by appropriately increasing certain responsibilities of the Regional Councils, yet maintaining necessary oversight by the Secretary of Commerce. S. 1668, as well as its House counterpart, H.R. 5002, goes too far in attempting to "defederalize" the Regional Council management process. While we agree that it is appropriate to take some steps in this direction, we remain extremely concerned that most of the provisions in S. 1668 would accomplish this objective at the expense of the fishery resources themselves because no adequate means would remain in the Act to assure necessary coordination to provide effective conservation and management between the various regions. This concern is especially applicable to migratory resources such as anadromous fish. While some Regional Councils are ready to accept increased responsibilities for the management of fisheries in their geographic area, all too often states within the region have continued to manage their fisheries in a manner entirely inconsistent with the Regional Council fishery management plans for the same resources and with the interests of other state and tribal management jurisdictions. In addition, some of the regions share responsibility for the management of resources subject to fishery management plans developed by another Regional Council, and respect for the conservation and management interests of both Councils must be secured.

S. 1668 would encourage Regional Councils to avoid their legal responsibilities under the Act by giving them the power to so substantially restrict the Secretary's review of their recommendations as to make virtually meaningless the Act's requirement that Council actions comply with the provisions of the MFCMA and other law, such as Indian treaty rights. Removal or weakening of the central coordinating role provided by the Secretary of Commerce would extremely frustrate the attainment of sound conservation and management of fishery resources, especially for anadromous fish that migrate between the jurisdictions of different Regional Councils and through the jurisdictions of several states and Indian tribes, and would obstruct compliance with other legal obligations under the Act.

COMMITTEE STAFF COMMENTS ON AMENDMENTS

Our specific comments on the amendments prepared by the Committee staff have been provided to the staff. Our major interests and concerns, however, are summarized below.

1. Incentive to Secretary of Commerce to act in a timely manner by having plans, amendments, regulations go into effect within specified time if Secretary has not acted. There should not be a presumption that such documents comply with the requirements of the MFCMA and other law.

The proposed amendments include changes to Section 304 of the Act. The amendment provisions would allow fishery management plans (FMP's), amendments and regulations prepared by a Regional Council to become effective and be implemented if the Secretary does not act in a timely manner to approve, disapprove, or suggest changes to the documents prepared by a Regional Council by a definite deadline. This gives the Secretary of Commerce an appropriate incentive to act in a timely manner if he thinks an FMP or regulations prepared by a Council need to be changed before implementation. It also allows the Secretary to avoid the paperwork of preparing a formal "approval" document if he believes the plan or regulations are all right and should become effective in the form submitted by Council.

We believe the thrust of the amendments is good. However, we disagree with the amendments, as drafted, because the language would provide that, if the Secretary fails to act by the deadline, the plan or regulations would "be deemed" to comply with the National Standards, other provisions of the Act, and other law. We believe the general direction of these amendments should be maintained, but that the presumption that appears to be created by use of the term "deemed" should be stricken from the amendments before this Committee acts. This can be done without modifying the rest of the amendments, simply by providing that upon approval or if the Secretary fails to act within the time allowed, the plan or regulations shall be published in the Federal Register and shall become effective.

2. New time frames for Secretarial action in the amendments must be maintained to allow full and complete consideration of public comments.

As you consider amendments to provide for an incentive to the Secretary to act in a timely manner, and to speed the process of implementing plans and regulations, we believe it is essential for the Committee and the Congress to assure that the time frames for Secretarial decisions allow the Secretary to take full account of comments provided during the public comment period. We believe that these concerns have been taken into account in the draft amendments prepared by the Committee staff, dated April 19, 1982. However, because of the importance of these concerns, we are calling attention to this matter once again.

As time frames are changed for actions taken under the Act it is dangerously easy to neglect to assure that they take full account of the practicalities in completing a review of public comment after the end of a public comment period. If Secretarial action is demanded coincidentally with the end of the public comment period, or within a very few days after, then the Secretary clearly will not have the opportunity to take those comments into account as he prepares to make his decision. Were the Committee to neglect this concern, the result would represent a clear departure from the original intent of the MFCMA in assuring full public participation and open management processes. We don't believe that this result would represent the intent of this Committee, and we therefore request that special care be taken to assure that, if further amendments are considered by this Committee, the Senate or any conference committee between the House and the Senate, the time frames adopted must provide for enough time to allow full consideration of public comments.

3. Proposed amendments would allow Regional Councils to develop data collection programs to collect additional biological information needed for the development of fishery management plans, but amendments are unclear how costs of such programs will be paid.

The prepared draft amendments would add a new subsection, 303(e), to allow Regional Councils to develop data collection programs to collect biological information which would be helpful in the development of fishery management plans amendments and regulations. If the Secretary found that the data collection program submitted by a Council was justified, he would have to implement it.

The amendments address a very real need—to obtain sufficient reliable information about the fishery resources subject to Regional Council management to allow the Councils to develop plans and regulations that truly accomplish the conservation and management objectives of the MFCMA. We believe this is a very excellect objective. We also agree with the way the staff draft maintains Secretarial oversight to assure there is a review of a Council's program before implementation, both for substantive justification of the program and for coordination between Councils that might be concerned about or share responsibility for the fishery resources. We are concerned, however, about the silence regarding how these programs are to be funded. We recommend that the Committee include something in the amendment or in the appropriations authorization for the National Marine Fisheries Service (1) to fund this Section and (2) to indicate that these programs are to be implemented to the extent of the appropriations funding made available for them.

4. We are pleased that the amendments maintain the integrity of the Regional Council process by maintaining the participation of the federal regulatory agencies and by not providing for disproportionate representation for California.

We greatly appreciate that the amendments being considered by this Committee do not tamper with the representation on the Regional Councils in a manner that would weaken the regional management approach or reward disrespect for the present Regional Council process. We have been particularly alarmed at amendments being considered in the House of Respresentatives that would eliminate the voting participation of the regional directors of the National Marine Fisheries Service, the nonvoting participation of the regional directors of the U.S. Fish and Wildlife Service, and would go further to provide another voting member for the State of California on the Pacific Fishery Management Council (PFMC).

The amendments being considered by the House, in our view, threaten the very concept of regional management by eliminating from participation in the process two federal agencies that have direct management responsibilities for fishery resources affected by Regional Council management, not only under the MFCMA, but under other legislation as well. Furthermore, they would reward California by providing it highly disproportionate representation on the PFMC, despite the fact that California has consistently failed to adhere to the MFCMA requirements for management inside state jurisdiction consistent with Regional Council management plans affecting the same resources. In each of the past few years California has failed to adopt consistent regulations for fisheries inside its waters, especially frustrating the ability of the PFMC to achieve its conservation goals for depressed chinook salmon runs. This poposal in the House amendments is even more inappropriate because California has achkowledged that it is considering the adoption of inconsistent regulations for its fisheries within three miles of its coast again this year.

We sincerely hope that this Committee will not adopt amendments such as those being considered in the House, and that this Committee will not agree to any such amendments in a conference committee between the House and the Senate.

In closing, I would like to thank the Committee for its attention and interest in this mattter. The member tribes of the Northwest Indian Fisheries Commission are firm supporters of the Magnuson Fishery Conservation and Management Act and its purposes to bring about the conservation, protection and proper management of the anadromous fish runs off the Pacific coast, and all fisheries that are important to the United States. The purposes and provisions of the Act are consistent with the full achievement of the treaty fishing rights of each of the Northwest tribes, and we look forward to amendments to the Act that will help strengthen it and enable us to fullly achieve the goals of the Act.

The Northwest Indian Fisheries Commission and member tribes would be pleased to be of assistance to the Committee as you proceed with your consideration of amendments. If you have questions at this time, I would be happy to answer them.

Thank you.

The **Chairman**. I have to ask you to stop also, Mr. McMinds. Your statement will be in the record, but I cannot let all the witnesses go on as long as is worthwhile for them to go on when we have more witnesses that want to testify than we can fit in.

I do have some questions I want to ask you. What would be the specific formula for Indian representation on the Pacific Management Council? You make reference to it in your testimony, but I am not sure about how many, from what tribes, or how they will be picked,

Mr. **McMinds**. The House committee asked me that question last year and I answered this way: There are three general management areas or three areas of concern in Indian country. One is the California area, with the Klamath River being a major area of discussion right now. I think we would like to have a representative from that area.

Of course there is the Columbia River area. We would like to have a representative from there and one from the Washington area. We would send a representative from California, a representative from the Columbia River, possibly an Oregon representative, and a representative from Washington.

The **Chairman**. And how would they be selected? Who would select them?

Mr. **McMinds**. They would be selected by the respective commissions or organizations or tribal governments from those individual areas who would nominate the people to the Secretary of Commerce.

The **Chairman**. And if we had more than one tribe interested they would somehow have to work out between themselves who the nominee would be?

Mr. **McMinds**. Yes; in my case, to the Pacific Council, they worked out a way to support me.

The **Chairman**. Let me ask Mr. Meninick a question. Why do you feel that previous salmon plans have not adequately addressed the wild stock issue? You make reference to that in your testimony.

Mr. **Meninick**. Well, practices in the past have been without consultation with the tribes, and it went on to do things that was not really consultative with tribes. We feel we were left out during the planning process, and many of the plans we have available, our biological staff and our attorneys and so forth could provide much more adequate planning process than what has been without consultation.

The **Chairman**. OK. Let us come back again. Why have the past plans not been adequate? Sometimes you come up with adequate plans even with inadequate representation. What has been wrong with the past plans?

Mr. **Meninick**. Well, somehow we are on the losing end, because we are at the upper reaches of those fisheries and somehow the upper reaches are not considered. It is considered in the lower areas, where the most damage is done, and we cannot get down to, because of the jurisdictional issues, we cannot reach out as far as we can—because we are limited to our jurisdictional areas.

The **Chairman**. Mr. McMinds, you have some suggestions——

Mr. **Meninick**. Mr. Chairman, before I get off the floor, we have two attachments for the Senate Commerce Committee relating to a national ocean policy study and the Commerce Committee hearings on reauthorization of the Magnuson Fishery Conservation and Management Act. We would like to submit this as part of the record.

The **Chairman**. I will put it in right behind your statement if that is all right with you.

Mr. **Meninick**. OK. Thank you.

The **Chairman**. Mr. McMinds, you make reference to the wild stocks amendment, too. I want you to describe to me how you think it would work in practice, because I am sure you are aware it could result in major cutbacks or even closure of the ocean salmon fishery. You have heard that argument.

Mr. **McMinds**. I appreciate your asking that question, Mr. Chairman. In practice, on the coast of Washington, with the coastal Coho, through the able and capable assistance of the National Marine Fisheries Service and the cooperation of the National Marine Fisheries Service, we have developed a flexible ocean management regime that allows a fairly substantial ocean fishery on those fish. It also allows a nice escapement of those fish to the rivers to allow for conservation purposes as well as allocation of fish to Indian people in those upstream fisheries that Johnson Meninick is talking about.

I think that is for chinook salmon as well. I think the complicated Columbia River case is a good place to begin to start on the upper areas above Bonneville Dam. I think flexible management regimes is the name of the game, not overfish; define what perpetuation of the stocks are, you start there.

Begin by allocating to the various entities who need to have a share of the fish, make sure that everybody in line gets a share, and make sure that everybody in line is willing to participate in a rebuilding effort for those stocks. I think that will get you your insurance policy.

The **Chairman**. You think that will be enough to do it alone?

Mr. **McMinds**. I think that is a good start. Once you establish that management regime, you begin to establish the research and data base to branch out to attack other problems. Now, I do not think a simple formula like that is the answer, but it is the beginning. We have yet to begin on the upper Columbia River.

We are going backward. We have to start and go in another direction. We saw that problem on the coast. We defined our management regime. We are turning those coastal fisheries around, and I think you can do it there.

I would like to submit for the record, Mr. Chairman, some material from our Oregon Department of Fish and Wildlife and Washington State Department of Fish that summarizes Columbia River fish runs and fisheries from 1957 to 1978.

The **Chairman**. Whose publication is that?

Mr. **McMinds**. It is Columbia River fish runs and fisheries, 1957 to 1978. It is from O.D.F. & W. and WDF.

The **Chairman**. I would be happy to include it.

[The material referred to follows:]

TABLE 3.—TOTAL COMMERCIAL LANDINGS OF SALMON AND STEELHEAD FROM THE COLUMBIA RIVER, 1957–58.

[In thousands of fish]

Year	Chinook	Coho	Sockeye	Chum	Steelhead	Total
1957	339.1	46.3	65.1	2.7	97.8	551.0
1958	371.7	18.7	176.2	7.4	91.2	686.2
1959	267.8	15.2	185.0	3.5	108.1	576.6
1960	265.5	17.7	120.0	1.3	94.3	498.8
1961	253.6	37.7	40.7	1.4	100.3	433.7
1962	310.8	65.3	14.3	3.9	99.1	493.4
1963	249.0	65.2	14.0	1.2	116.7	496.1
1964	269.3	206.2	20.8	1.9	55.4	553.6
1965	335.5	234.7	4.9	.5	64.3	640.9
1966	201.0	423.8	4.4	.9	47.4	677.5
1967	262.4	382.4	55.7	.9	50.1	751.5
1968	220.0	132.7	25.3	.3	44.9	423.2
1969	317.9	197.9	27.5	.3	48.2	591.8
1970	356.5	536.3	17.1	.6	32.9	943.4
1971	331.4	277.4	76.2	.5	51.0	736.5
1972	318.7	140.0	77.9	1.3	62.2	600.1
1973	453.6	194.8	3.7	1.4	51.6	705.1
1974	191.0	267.8	<0.1	.9	19.3	479.1
1975	322.8	162.3	0	.5	6.7	492.3
1976	288.4	172.4	.1	1.2	9.6	471.7
1977	255.9	40.1	.1	.2	35.2	331.5
1978	(188.7)	(136.3)	0	1.5	20.1	(346.6)

TABLE 8.—COLUMBIA RIVER WINTER SEASON CHINOOK AND STEELHEAD LANDINGS, ZONES 1-5,JANUARY–MARCH, 1957–78.

[In thousands]

Year	Pounds		Numbers	
	Chinook	Steelhead	Chinook	Steelhead
1957	40.3	60.4	2.0	6.0
1958	140.6	58.6	7.2	6.6
1959	148.5	44.1	7.3	4.3
1960	82.8	52.7	4.6	6.3
1961	107.3	97.2	4.9	9.6
1962	56.5	86.8	2.8	9.9
1963	106.9	69.1	5.4	7.8
1964	116.8	47.5	5.6	5.4
1965	64.4	84.3	3.2	9.5
1966	83.6	66.1	4.1	8.0
1967	139.3	82.8	6.8	8.4
1968	181.4	79.1	8.7	8.4
1969	168.2	107.0	8.6	12.8
1970	252.9	38.3	12.5	3.6
1971	278.0	49.3	13.4	4.7
1972	331.0	90.0	15.8	8.5
1973	337.5	26.3	17.2	2.1
1974	277.0	24.6	13.3	2.2
1975	184.8	0	9.1	0
1976	96.1	0	4.7	0
1977	132.5	0	6.8	0
1978	(265.0)	0	13.5	0

Mr. McMINDS. I want to put particular emphasis on the steelhead runs, to show you what the stock strengths are. And I want to comment by saying that it was a little unfair to say that the steelhead runs have declined as well. Some runs have declined, but not as dramatically as the chinook.

The sockeye has declined, but there is a different situation with sockeye. There has been no mitigation money of any substantial amounts to preserve those sockeye. Sockeye react much differently to dams and they react much differently to artificial propagation efforts. So they are somewhat unfair in their comparison.

Steelhead seems to be holding up, at least on the A run.

The CHAIRMAN. Gentlemen, I have no more questions. As usual, it was a good presentation. Mr. McMinds, good to see you again.

Mr. McMINDS. Thank you.

The CHAIRMAN. Gentlemen, I appreciate your being so patient and waiting. Thank you.

[Whereupon, at 12:47 p.m., the committee was adjourned.]

ADDITIONAL ARTICLES, LETTERS, AND, STATEMENTS

STATEMENT OF HON. ALAN CRANSTON, U.S. SENATOR FROM CALIFORNIA

Mr. Chairman, I'm pleased to have this opportunity to convey to the Senate Commerce Committee my deep interest in continuation of the Fruit Frost Forecast and Advisory Program and agricultural weather stations administered by the National Weather Service under the National Oceanic and Atmospheric Administration.

The Fruit Frost Forecast Program is extremely important to the citrus and fresh vegetable growers in California, Florida and Texas. For over sixty years, the Fruit Frost Forecast Program has provided critical information about minimum temperatures during the spring frost season in these three states. It has proved to be a vital tool to growers of the many frost sensitive crops in planning for frost and protecting the crops when necessary, thus keeping down the cost to consumers and assuring that full, healthy crops come to the market.

Because the information is gathered on a very detailed basis—often down to the square mile—the Fruit Frost Forecast Program can provide much more than frost warning. It is a complete weather advisory and forecast to the agricultural community. Depending upon the time of year and types of crops grown the information can also include soil and water temperatures, sunshine and radiation, air motion, dewpoint and humidity, type and direction of rains, evaporation, and temperatures condusive to pest emergencies. Thus farmers for the majority of crops grown in California use these reports to assist them in livestock protection, planting, drying, spraying, harvesting and irrigating decisions as well as frost protection.

If the Fruit Frost Forecast Program is eliminated, the more general public weather zone forecasts and warnings prepared by the National Weather Service would continue. But the forecasts would not be site-specific and thus would be of marginal use for farmers now served by the Fruit Frost Forecast Program.

Nationwide the efforts of adverse weather on agriculture and related activities have been estimated to cost growers and consumers $9 billion annually, with direct crop losses alone of $1.6 billion a year. In California between $1 and $3 billion worth of the state's $13 billion agriculture is frost sensitive. Estimated annual crop savings from Fruit Frost Forecasting to California citrus alone amount to approximately $70 million.

The Fruit Frost Forecast Program is so important to California growers and producers that last year when the Reagan Administration first proposed termination of the fruit frost service they expressed a willingness to take over the program and expenses previously borne by the federal government. However, after looking into the feasibility of such a change, California growers concluded that private sector administration of fruit frost forecasting was not viable. There is no mechanism to assess farmers for the forecasts and no consensus on how the costs should be shared among large and small growers. The private meteorological industry is concerned about liability. And there are not enough people in the private sector with expertise in agricultural forecasting to do the job. Thus, if the Fruit Frost Forecast Program is to continue—and I hope it will—it must continue under the administration of the National Oceanic and Atmospheric Administration.

Mr. Chairman, NOAA's Fruit Frost Forecast Program costs a very small amount of money, especially when considered in the context of the federal budget as a whole—only $400,000 annually if fully funded, the same amount as the Department of Defense is spending every minute in fiscal year 1982. Thus, Mr. Chairman, I urge you and the other members of the Senate Commerce Committee in your consideration of an omnibus NOAA authorization bill to include a provision continuing the Fruit Frost Forecast Program.

Thank you.

STATEMENT OF THE NATIONAL WILDLIFE FEDERATION

Mr. Chairman, the National Wildlife Federation (NWF) is a private, not-for-profit conservation-education organization with over 4 million members and supporters and affiliate organizations in the 50 States, Guam, Puerto Rico, and the Virgin Islands. Many of our members and members of our affiliate organizations enjoy the natural resources of our estuaries and oceans. NWF has consistently expressed concern for marine and anadromous fisheries and has staunchly supported U.S. management of fisheries resources within the 200-mile limit.

We appreciate the opportunity to provide our views on S. 2450, a bill to amend the Magnuson Fishery & Conservation Management Act (MFCMA), and the fiscal year 1983 budget for the National Marine Fisheries Service (NMFS). The MFCMA is landmark legislation which has proven to be a viable mechanism to manage our ocean fishery resources for the benefit of all. Amendments to improve this legislation and incorporate the experiences of those actively involved in the day-to-day activities of managing fisheries under the Act would be beneficial. We consider the wise use and conservation of our ocean's living resources to be vital to our nation's continued prosperity. Management planning which maximizes, yet protects, these resources must include the ability to respond rapidly as dynamic fisheries adjust to environmental factors that affect recruitment, growth, and natural mortality, changing inter-species relationships, and mortality due to fishing.

S. 2450 should result in a more responsive system of fisheries management. However, we wish to emphasize the need to continue to provide adequate opportunity for public input to the management process and to maintain full documentation, readily accessible to the public, of the activities associated with fishery management planning. We commend the work this committee has done in drafting an excellent bill and offer only a few comments or qualifications that we ask you to consider in your deliberations on this legislation.

SECTION 201 (E)

We agree with the proposed amendments to MFCMA which provide for reduction of allocations to foreign nations not complying with understandings or agreements considered to be significant factors in the determination of allocation. Only by timely and effective response to violations of rules can the conservation and proper allocation of our fisheries resources be assured.

SECTION 201 (J)

We approve of the added language that provides foreign private (not-for-profit) recreational fishermen the opportunity to operate their vessels and fish in the Fishery Conservation Zone (FCZ) and inside state boundaries as conditioned by the Governor of the state and the Secretary of Commerce. Recreational fishing is an important use of our fishery resources and provides a high return to our nation's economy. States should have the right to allow foreign recreational fishing in their waters and to condition such fishing by permits or licenses and relevant harvest regulations. The economic benefit to coastal states from recreational fishing can be quite high. Such fishing can be allocated greater levels of harvest from foreign commercial allocations to further expand this valuable use of our marine fisheries. Naturally it is important that foreign recreational fishing not be directed at limited stocks sought by U.S. recreational fishermen. In addition, provision for recreational fishing logically should be reciprocal in the sense that U.S. recreational fishermen have equivalent access to foreign waters.

SECTION 302 (B)

We support proposed additions to MFCMA that detail the qualifications for Council members, procedures for removing unqualified individuals from the governor's list of nominees, and provide for removal of Council members. We feel it is extremely important to have competent individuals serve on the Councils. Council members must be capable of making fair and intelligent judgments based on complex biological, economic, and social criteria.

SECTION 302 (I)

We support the addition of this section to MFCMA which specifies that Councils shall determine whether a fishery needs management. We also support the provision that Councils justify decisions regarding management in writing, publish such justification in the Federal Register, and receive review and comment from the public (although we question whether a 30-day comment period is sufficient to allow full public participation). However, the amendment also allows the Secretary to make the final decision regarding need for a Fishery Management Plan (FMP).

There should be a mechanism to settle differences between the Councils and the Secretary over the need for managing a fishery.

Provision should be included to allow the Councils to implement management plans for a fishery even if the fishery is in good condition, i.e., as a preventative measure against anticipated problems. Because of budgetary constraints and in anticipation of funding problems, policies might be adopted by either a Council or NMFS requiring FMPs to be developed only when a fishery can be documented to be in dire need of management and when the condition of the stock is critical. We understand that not all fisheries require intensive management and that FMPs may be unnecessary for fisheries controlled by effective international agreement (e.g. Pacific halibut) or by the various states (e.g., striped bass). We also understand that continual monitoring of stocks not under management may provide an early warning system that indicates the need for FMP development. However, fisheries are dynamic and changes occur rapidly. The legislation under consideration includes a provision for rapid response, but where an appropriate data base does not exist, rapid decision making could incorporate significant errors.

It is important that the need for managing a fishery be evaluated and presented to the public for comment. At minimum, such evaluations will provide the Councils a base from which future emergency action rapidly may be developed. Even emerging fisheries, perhaps often assumed capable of withstanding a few years of unmanaged harvest, should be evaluated. For example, had the developing ocean quahog fishery not been evaluated and a management plan developed, serious overharvest in some areas could have severely affected the potential to manage that fishery for optimum yield. In other words, there remains a need to prevent a healthy fishery from declining (via FMP) to the point where the only option is between emergency management or temporary (perhaps complete) loss of a fishery.

SECTION 302 (J)

We support this amendment to require response by federal agencies to Council comments on the agencies activities that impact on fishery resources for which the Council has responsibility. It seems reasonable to ensure such cooperation by federal agencies, especially since so many actions can have the potential to adversely affect living marine resources.

SECTION 302 (K)

This amendment will exempt the Councils from the Federal Advisory Committee Act. It is the intended purpose of this amendment to speed Council functioning yet maintain full opportunity for public participation. As a private organization NWF is extremely concerned that the intent of Congress, to provide for public participation in the management of our ocean fisheries, be maintained in MFCMA. The proposed language appears to accomplish this purpose, but we wish to emphasize that timely notice of Council activities and decisions, and adequate provision for public participation are primary factors in the success of this legislation. Additionally, we wish to request that all communications, both written and oral, that are incorporated into the Council's decision making process be maintained as part of the public record.

SECTION 303 (C)

We support the requirement that proposed regulations be part of management plans submitted for review and public comment. This amendment will enhance the review process and aid the public to participate in developing FMP's.

SECTION 303 (F)

NWF supports the need for Councils to develop data bases sufficient to determine the need for management, prepare FMPs, and amend FMPs. It is extremely important that the management of fisheries be based on the most up-to-date, accurate, and relevant data practicably obtainable. Since Councils are in the best position to determine their data needs, it is sound policy for Councils to have the authority to initiate scientific studies or data collection programs. It might also be useful in FMP development to extend the scope of this amendment beyond "biological resource information" to social and economic information relevant to FMP impacts.

SECTION 304 (A)

We support the direction of this amendment, to speed the FMP review process by the Secretary by setting time limits on various actions. While we agree that the dynamic nature of fisheries and their management mandate speeding the FMP and Amendment review process, we are concerned that such acceleration not diminish the provisions Congress provided in MFCMA which ensure that public comments be fully evaluated in the FMP review process. Secretarial review should be accelerated only to the point where adequate consideration of public concerns remains possible.

SECTION 305(A)

Again, we support the direction of this amendment which improves the timeliness of FMP and amendment review by requiring that the Secretary publish, as soon as possible, the proposed regulations and a notice of availability of the FMP or Amendment in the Federal Register, and allow 30 days for public comment. Our concern is that 30 days may be an insufficient period in which to obtain a copy of the FMP or Amendment and provide critical review sufficient in depth and quality to allow incorporation into FMP development.

SECTION 306(A)

We strongly agree with this proposed amendment clarifying the states right to manage fishery resources within federal enclaves of the FCZ. It is our opinion that states must have the right to manage living marine resources within that state's waters.

PROTECTION OF WILD STOCKS OF SALMON AND STEELHEAD IN THE NORTHWEST

Amendments to MFCMA have been proposed that would mandate protection of all naturally spawning runs of anadromous fish that spawn in the United States. We are concerned that harvest of Westcoast salmon stocks under regulations of the Pacific and North Pacific Fishery Management Councils and other regulating agencies may be inconsistent with maintaining safe numbers of fish in wild stocks. Although it would be impractical, and technically unfeasible at this time, to mandate full protection of wild runs of salmon, we do suggest that consideration of maintaining these wild stocks be an integral part of management planning by the Councils when developing FMPs for salmon and that salmon management be coordinated and consistent throughout the range of each stock. At this time, we feel that any provision for managing wild stocks should be restricted geographically to the West coast and to salmon (*Oncorhynchus* spp.) and steelhead (*Salmo gairdneri*).

Perhaps more could be done to protect wild runs than is being done at present. Potential methods for maintaining the runs should be fully investigated, including research on methods to enable greater separation of harvested stocks. It is conceivable that at continued levels of harvest under present management practices, some otherwise viable wild runs of fish could collapse. It is difficult to conceive of our salmon resource produced in California, Oregon, and Washington as a product wholly born of a series of hatcheries. We recognize that the primary reason wild runs are in danger may be the result of wholesale loss of spawning habitat and juvenile rearing areas. However, until efforts to repair past damages are more fully realized, the runs of fish genetically adapted to fill these impacted rivers and streams need to be maintained. As these rivers and streams recover, stocking them with fish of uniform genetic makeup may seem simple and relatively inexpensive, but it overlooks the fact that the unique gene pool of each stock of salmon and steelhead provides the basis for proven success and adaptation to the subtly unique environment of each stream. Fisheries managers should be encouraged to maintain these genetically diverse stocks.

In addition, although the success and subsequent recruitment to the fishery of naturally produced salmon and steelhead are not dependent on the budgetary status of our federal and state governments, the production of hatchery fish is. Present funding proposals for the NMFS Columbia River Fisheries Development Program (CRFDP) place hatchery production in jeopardy. Hatcheries funded by the CRFDP represent a primary component of the federal government's obligation to compensate for fish losses on the Columbia River caused by hydropower projects, irrigation, and flood control. Over $128 million has been spent under this program since 1949 to construct, operate, and maintain hatcheries and fish passage facilities, enhance and refurbish streams, and conduct research. These activities have increased the runs almost threefold since the 1960s. The CRFDP, which now costs the government only about $10 million annually and includes programs for research and stream improvement, operates on a cost benefit ratio of about one federal dollar for every twenty dollars benefit to our nation's fishermen. The entire program is scheduled for elimination on a three year phase-out plan proposed by the administration. This year's reduction will eliminate 9 of the 22 hatcheries in the program. Losing these nine hatcheries means a loss of about $50 million worth of salmon and steelhead and a subsequent unknown increased pressure on wild stocks as the availability of salmon and steelhead decreases to recreational and commercial fishermen. We recommend continued funding of this program.

INCLUSION OF TUNA UNDER UNITED STATES EXTENDED FISHERIES JURISDICTION

A bill to amend MFCMA, the American Tuna Act (S. 1564) was introduced in this session of Congress. This proposed legislation would include tuna under the provisions of MFCMA. It is important that the United States gain better control over tuna within the FMZ, not only to ensure proper management of the rapidly dwindling western Atlantic bluefin tuna stock and other tunas, but also to provide added protection for our extremely important recreational fishery for billfish, often a significant by-catch in the longline fishery for tuna. As Mexico and other Latin American countries build up their tuna fishing fleets and our attempts to create a new organization for tuna in the Eastern Tropical Pacific further erode, it seems obvious that the U.S. must initiate proper management, where we can, and continue to negotiate internationally for the purpose of managing the harvest of tuna beyond the 200-mile limit.

International commissions seem unable to provide for adequate conservation of tuna. For example, the harvest of Atlantic bluefin tuna has become a shocking race for "the last fish". In November of last year the Standing Committee on Research and Statistics of the International Commission for the Conservation of Atlantic Tuna (ICCAT) recommended that its member governments prohibit the capture of bluefin tuna for two years in the western Atlantic Ocean because stocks were in critical condition. Later, participating scientists "reexamined" the status of the stocks and stated that a small surplus may be indicated and they agreed to allow the lowest level of harvest possible to permit the continuation of ongoing scientific studies. This harvest was determined by U.S. representatives to be 565 metric tons (MT). The ICCAT set the catch level for this year in the western Atlantic at 1,160 MT, disregarding all measures of conservation and even the recommendations of their own scientific committee.

United States control of all tuna in our waters will benefit both the resource and our developing tuna fishing industry, although some immediate losses may be sustained by our distant water fleet. In addition, if tuna were placed in MFCMA, our policies would then be consistent with the vast majority of coastal countries that manage tuna under extended fisheries jurisdiction.

NATIONAL WILDLIFE FEDERATION COMMENTS ON THE NATIONAL MARINE FISHERIES SERVICE'S FISCAL YEAR 1983 BUDGET

NWF is opposed to the disproportionate cuts in the proposed budget for NMFS. The Administration has proposed a full 33-percent reduction in NMFS funding from a base of $157.6 million in fiscal year 1982 to a total funding level of $106.7 million in fiscal year 1983. Considering the level of inflation, the reduction in funding actually will be greater than one-third of the budget of an agency that we feel has been underfunded for the past several years. If the proposed fiscal year 1983 budget is implemented, NMFS will be unable to maintain essential services to commercial and recreational fishermen and will be unable to continue to develop fisheries management strategies that conserve and fairly distribute our nation's marine and anadromous fisheries resources.

NWF appreciates the very professional efforts of NMFS administrators to lighten the impact of these drastic cuts. Unfortunately, it will be difficult, if not impossible, for this agency to continue to function in a reasonable manner if these budget cuts are fully implemented. As now planned, these reductions will greatly harm NMFS's ability to perform impact review and analysis in addition to other important functions. These reductions will be rapidly felt in many coastal areas of the U.S. and we encourage the Senate, and this Committee in particular, to fully examine these impacts before accepting the Administration's proposal. The proposal, based on false economics, is designed to save a few federal dollars at the expense of recreational and commercial fishermen who utilize a resource worth over $12 billion in 1980.

NWF recognizes the need to reduce federal spending, reduce unnecessary and burdensome regulations, and return to the states programs that are best handled by local government. However, by eliminating important state-federal cooperative programs such as Anadromous Fish Conservation Act grants (P.L. 89-304), where there is clear federal as well as state responsibility, he federal government is making an indisputable statement of apathy for our valuable fisheries resources.

Although NWF is concerned with a broad array of NMFS programs and the potential effect of the proposed funding levels on these programs, the remainder of our statement will concentrate on five programs with which members and affiliates of our organization have expressed extreme concern.

ANADROMOUS FISH CONSERVATION ACT (AFC)

Anadromous fish constitute a resource that by their very nature are a shared state-federal responsibility. These fish spawn in states' waters, but as adults migrate freely in the ocean and across states' boundaries, and, in some cases, such as the Atlantic salmon, between nations. Clearly, the complete elimination of the state-federal Anadromous Fish Program, as has been proposed, is a federal repudiation of its responsibility to support research, management, and enhancement of shared fishery resources. In addition, elimination of this program will sacrifice the major investments of the past decade in ongoing research and data collection.

The track record of programs funded by AFC monies is clearly an impressive one. Since the program began, the total federal investment of $76 million has yielded over $1.2 billion in direct benefits to our nation's fishermen.

A good example of the successful use of the state-federal grants can be seen in the restoration of American shad and blueback herring to a single section of the Connecticut River in Massachusetts. In the early 1970's only about 50,000 anadromous fish per year passed over the Holyoke Dam on the Connecticut River in Massachusetts. By 1976, nearly 400,000 fish passed over the dam, and as of last year, the run of fish in that location exceeded 1 million. This dam was the first over which fish were passed in the reestablishment of the Connecticut River anadromous fish run. Upriver, two additional dams were recently retrofitted with fish passage facilities and at dams farther upstream, plans for fish passage have just begun.

On this same river system, the return of the highly prized Atlantic salmon has been equally as dramatic. Starting with the return of a single fish in 1974, the numbers of Atlantic salmon that moved into the Connecticut River to spawn jumped to 7 in 1977, 175 in 1980, and last year a total of 553 Atlantic salmon ascended the River.

Who benefits? Certainly, anglers in the four states bordering the Connecticut River benefit, as do recreational and commercial fishermen along the coast because these Connecticut River anadromous fish migrate along the Atlantic Coast from North Carolina to Maine and into Canadian waters. The shared nature of this resource demands federal involvement.

NWF is also deeply concerned about the anadromous striped bass. In March of this year, NWF passed a resolution (attached) that expressed extreme concern that striped bass be properly managed and that funds be provided for Section 7 of AFC, commonly known as the Chafee amendment or the Emergency Striped Bass Study (Public Law 39-304, as amended). The proposed NMFS budget includes no money for Section 7. The striped bass is one of America's most esteemed game and food fishes and it has been a staple for commercial fishermen since colonial days. Anyone who fishes along the Chesapeake Bay or the Atlantic Coast, or knows someone who does, is aware of the low number of fish being caught; populations are declining and action, not inaction, is needed.

The Emergency Striped Bass Study was implemented to monitor the status of striped bass stocks and to determine factors responsible for their decline along the Atlantic Coast. These studies were coordinated with other state and federal activities, not to develop management plans, but to provide the information base from which to develop those plans and to determine the causes of the striped bass decline. Since the initiation of the Study, funding has not been appropriated at authorized levels, and Atlantic Coast striped bass stocks have sustained the worst spawning success and lowest subsequent recruitment in recent history. We strongly urge that funding be provided to allow ongoing and essential studies to be completed. To deny funds now for this purpose may bring us to the point where expensive hatcheries must be used as a substitute for the extensive striped bass spawning and rearing grounds of our East Coast rivers and estuaries.

We urge this Committee to request restoration of $3.2 million for the Anadromous Fish Program for fiscal year 1983; $0.4 million for Section 7 and $2.8 million for other AFC activities.

CONSERVING MARINE RESOURCES

The Habitat Conservation Program of NMFS appears to have been singled out for extraordinarily large cuts. At the same time the pullback in environmental assessment and impact analysis activities by other federal agencies has increased the need for services provided by this program. NMFS consultation is requested by various federal agencies on almost 20,000 actions annually as a result of requirements of the Fish and Wildlife Coordination Act, the National Environmental Policy Act, the Federal Water Pollution Control Act, and other legislation. NMFS provides these agencies with information and recommendations necessary to use our ocean resources wisely. Yet this essential program will receive a 42-percent cut in funding over fiscal year 1982 levels.

The environmental effects of activities such as ocean dumping, outer continental shelf development, and power plant construction and operation on the marine environment, especially on the resources and habitats important to fisheries of recreational and commercial value, are assessed by the Environmental Impact Analysis Program. However, these important impact analysis activities are slated for virtual elimination in some regions of the country, while in other regions, funding will continue at fiscal year 1982 levels. In the Northeast Region, a single individual will remain of the eleven NMFS staff who conducted these activities in fiscal year 1982. This individual will be responsible for an area that includes Georges Banks (one of the world's most productive fisheries), extensive salt marsh and estuarine areas, expanding anadromous fisheries, burgeoning coastal development, and a developing offshore oil industry. The budget allocated to impact assessment activities in the Northeast will be reduced by 70 percent. In the Southeast Region, which extends from North Carolina on the Atlantic Coast to Texas on the Gulf of Mexico, the cuts in funding will be about 30 percent. This area harbors some of the world's most extensively developed offshore oil lands and an expansive array of estuaries that provides 90 percent of the fisheries harvested in the Gulf. At the Washington office, the budget will be reduced by over 80 percent. We believe that the Environmental Impact Analysis Program cannot function effectively with such drastic budget reductions. Such cuts will hamper the ability of NMFS to safeguard our marine resources and, thus, will decrease the effectiveness of legislation promulgated to protect our marine environment.

Habitat Investigations, the research component of the NMFS Habitat Conservation Program, has also been severely affected by the budget axe: 100-percent cut in funding in Washington; 98-percent cut in funding at the Southeast Center; 56-percent cut in funding at the Northeast Center; and 24-percent cut in funding at the Northeast Center. Research conducted by NMFS provides essential information on the effects of chemical contamination and physical alteration on fishery habitats and the impacts upon the distribution, abundance, and physiological function of economically valuable fishes. This research is especially important is both recreational and commercial fishermen because it has focused on the effects of altering the environment in inshore areas where the bulk of our most important fisheries resources are nurtured. These inshore areas often are subject to the highest levels of contamination and development, yet these areas also support many fish during their most sensitive life stages (the eggs and young).

The Habitat Conservation Program cannot continue to implement conservation programs that effectively protect marine fisheries and other living marine resources and their environment if the Administration's recommendations are accepted. We recommend that funding at fiscal year 1982 levels be restored to this valuable program and that all Regions and Centers be adequately staffed and funded.

COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT ACT

Fisheries grants to states under Public Law 88-309, the Commercial Fisheries Research and Development Act, have been very important in developing a research base for the management of coastal and offshore fisheries. These monies fund studies conducted by the states that are essential to the development and continual update of FMPs by the Regional Councils, and in general, to the responsible management of anadromous and marine fisheries. Again, because of the State-Federal responsibility for the stocks that are assessed by these funds, there is a clear need for continued Federal involvement. The Administration has recommended that no funds be appropriated for this program in fiscal year 1983. The Administration's concern that programs exclusively benefiting individual states be paid for by those states is certainly reasonable, but the significance of the Fisheries Research and Development Program to the nation as a whole is clear. Although individual states that receive these monies do benefit, do so citizens of all states when, by proper management of our fisheries, these resources yield an optimal harvest on a continued basis for all fishermen, both recreational and commercial. We recommend that

$5 million be restored to the budget of NMFS for Commercial Fisheries Research and Development.

MARINE RESOURCES MONITORING, ASSESSMENT, AND PREDICTION (MARMAP)

The Magnuson Fishery Conservation and Management Act mandated management of our fisheries resources (except tuna) seaward to 200 nautical miles from our shores. With this mandate came the need for more kinds of data and improved accuracy as Regional Fishery Management Councils began to formulate FMPs for our economically important fisheries.

An extremely important and highly complex responsibility of NMFS is the assessment and monitoring of marine fish stocks. Only with precise and timely information is it possible to develop management strategies for the highly dynamic stocks of fish off our coasts. Presently, multispecies plans (such as ground fish plans) are being developed and implemented; such management requires an even greater depth of scientific knowledge. In practice, most marine fisheries are very complex. Often a fish stock disperses or travels over a wide area, is impacted by varied factors and at different life stages, and can be harvested by a number of means. NMFS survey data is often the only source of information from which to develop FMPs. There are presently 22 fisheries under management, 8 of which are under Preliminary Management Plans. The 14 FMP's already in place have been amended 49 times. Many additional FMPs are in various stages of development. All these management plans require extensive data and continual update as the fishery fluctuates. Yet, in spite of this clear need for increased quantity and quality of information, $4 million is being eliminated from the MARMAP Program. We recommend that this $4 million be restored to the MARMAP Program.

REGIONAL FISHERY MANAGEMENT COUNCILS

It is the responsibility of the eight Regional Fishery Management Councils to develop FMP's that optimize the use of our ocean fisheries resources on a sustaining basis. The Regional Councils must be responsive to the day-to-day complex problems of managing a dynamic resource upon which often competing demands are placed. The Regional Councils oversee the management of a commercial U.S. and foreign harvest worth $6.4 and $1.4 billion, respectively, in 1979, and a marine recreational catch worth $6 billion and supporting at least 20 million anglers in 1980. We feel that it is absurd to jeopardize a resource worth over $12 billion to our country's recreational commercial fishermen for a savings of a mere $3.3 million, yet this is what the Administration would do in proposing a 44-percent cut to the Regional Councils' fiscal year 1982 budget of $5.9 million.

Eliminating nearly one-half of the budget of the Regional Councils seems especially unwise as more fisheries, and more complex fisheries, are coming under Regional Council management authority. The more fisheries that are managed, the more it will cost to implement the program, and the more species managed as a unit, the more detailed and accurate FMPs will have to be. The need for increased scientific information and state-federal cooperation is inseparable in this process and requires adequate funding, not only for the Regional Councils but also for programs such as Anadromous Fisheries, Commercial Fisheries Research and Development, and Marine Resources Monitoring, Assessment, and Prediction. As the excesses of previous exploitation of our fisheries resources are corrected, and the value of these resources increases, a commensurate commitment to continue effective management seems mandated. The role of the Regional Councils should be an active one. Just monitoring fish stocks is insufficient. The cuts to the Regional Councils should be restored to fiscal year 1982 levels.

Effective utilization of our ocean fisheries requires innovative and aggressive management strategies that involve intense efforts by scientists, economists, industry, government (state and federal), and the public. Effective fisheries management requires money, but the rewards can be great. We are fortunate in this country to have the potential to truly manage our fisheries. Under the Administration's proposed budget for NMFs, our talents will be wasted and our potential gains will be lost, all for the sake of a false economy.

Thank you very much for the opportunity to present our views.

RESOLUTION No. 14

STRONGER MANAGEMENT EFFORTS FOR MARINE STRIPED BASS POPULATIONS

Whereas, pressures on this limited resource are strong and increasing due to the high market value of marine striped bass and growth of recreational and commercial fishing industry, despite a decline in population levels;

Whereas, the major Chesapeake Bay spawning areas have not produced a dominant year class of the species since 1970; and

Whereas, the species and its fishery occur predominantly within three (3) miles of the coast from Maine to North Carolina, management jurisdiction for marine striped bass resides with the states rather than the Federal Government; and

Whereas, this coastal migratory stock is subject to varying laws and regulations of twelve (12) states and two (2) interstate commissions with a lack of coordination or cooperation; and

Whereas, many attempts have been made to manage this fishery in the past, but these attempts thus far have been unsuccessful. The present magnitude and efficiency of both commercial and recreational fisheries may deplete the resource levels from which recovery is slow or impossible; and

Whereas, funding for research is too limited and uncoordinated; now, therefore, be it

Resolved, That the National Wildlife Federation, in annual meeting assembled March 18-21, 1982, in Milwaukee, Wisconsin, hereby recognizes that the migratory marine striped bass which ranges from Maine to North Carolina is a species in need of stronger management efforts, including greater cooperation among the states and commissions responsible for its welfare; and be it further

Resolved, That this organization stresses the vital and urgent need for continued funding under present legislation to satisfactorily conclude the mandate encompassed in the Chafee amendment to Public Law 89-304.

STATEMENT OF THE CALIFORNIA-ARIZONA CITRUS LEAGUE

My name is William Quarles and I am President of the California-Arizona Citrus League (The League).

The League is a voluntary, nonprofit trade association composed of marketers of California-Arizona citrus fruits. Members are farmer cooperatives and independent shippers representing over 75 percent of the 10,000 citrus fruit growers in Arizona and California. These growers produce oranges, lemons, grapefruit, tangerines and limes.

The League appreciates the opportunity to present its views on a matter of industry concern, namely the need to preserve the Fruit Frost Forecast and Advisory Service Program. The Fruit Frost Program, administered by the National Oceanic and Atmospheric Administration provides citrus and fresh vegetable growers in California, Arizona, Florida, and Texas with detailed site-specific minimum temperature forecasts and other advisory services that support implementation of measures for avoiding or lessening frost damage to crops. While "zone forecasts" issued by the nearest National Weather Service forecast office for the areas involved include both maximum and minimum forecasts, such forecasts are not site-specific and thus are of marginal use to farmers now served by the Fruit Frost Program.

The Fruit Frost Program consists of trained agricultural meteorologists who monitor conditions which could damage crops. Information is gathered on a very detailed basis—often down to the square mile—and is disseminated to interested persons through television, radio and telephone recorders. For example, the California Fruit Frost Service covers those areas where frost sensitive crops are grown, from the Northern Sacramento Valley down to the Mexican border. Of the $15 billion worth of California Agriculture, over $1 billion is frost sensitive. The estimated annual crop-loss savings in California alone approaches $70 million.

The National Weather Service estimates that there are approximately $1.6 billion in weather-related crop losses each year. In addition, weather impacts other areas of agriculture by causing reduced yields associated with plant and animal diseases, insects, pollution and water use. These additional weather-related losses are estimated by the National Weather Service at $9 billion annually. While these losses cannot be avoided entirely, it is possible to reduce agricultural losses significantly through better forecasts and information.

The Fruit Frost Forecast and Advisory Program in California has been in existence for over 60 years, serving many segments of California agriculture extremely well. Indeed, program audits have shown that of all the Weather Service programs (which provide an estimated return of $20-30 in crop and livestock savings for every dollar spent) the Fruit Frost Program has one of the highest cost-benefit ratios. Additionally, the Fruit Frost Program provides much more than minimum temperature forecasts. It provides complete weather advisory forecasts to the agricultural community. It also provides information on spray and dusting weather, winds, high temperatures, humidity, rainfall and rainfall amounts, and orchard dry times.

The information provided by the Fruit Frost Program is also of importance in the various Integrated Pest Management (IPM) Programs which have been implemented in the past several years. An important factor in these IPM Programs is accurate and timely weather data. Without good weather data we cannot accurately predict insect and disease life cycles. Therefore we cannot effectively time control measures where warranted.

The members of the League were most distressed to learn of the proposed elimination of this vital program. The League's members are also puzzled as to why this program has been targeted for elimination. The Program cost $209,000 for the past year. As noted above, the benefits produced by the program far exceed its small cost. Further, it would be very difficult if not impossible for this program to be operated by the private sector without an interruption in service. It must be remembered that even one year's break in service could prove disastrous to the agricultural community and the consumers of the nation. The successful operation of this program requires skilled personnel to conduct the forecasts together with the technical hardware necessary to develop the required data. Both of these items are not presently available in the private sector.

The League strongly urges that the Committee correct the shortsightedness of the Commerce Department in proposing to eliminate the Fruit Frost Program. We suggest that the Program be reauthorized for a three to five year period, at current funding levels with appropriate increases for inflation and employee benefits.

STATEMENT OF THE CALIFORNIA RAISIN ADVISORY BOARD

The California Raisin Advisory Board (the Board) under the auspices of the California Department of Food and Agriculture oversees the state marketing order for raisins. The Board represents over 4500 producers and processors of raisins who account for 100 percent of the United States and 30 percent of the world production.

The Board takes an active interest in matters of vital concern to the raisin industry including generic advertising, promotion and funding for research and producer information programs. We appreciate this opportunity to present a statement for the record strongly supporting the continuation of the Fruit Frost Forecast and Advisory Service.

For over 60 years, the Fruit Frost Program has provided the multibillion dollar fruit and vegetable industries in California, Arizona, Texas and Florida with accurate, site-specific minimum temperature forecasts and other advisory services. Armed with these detailed forecasts in advance of a frost, growers are better able to take the steps necessary for avoiding frost damage to crops. The "zone weather forecast" provided by the National Weather Service cannot take the place of the Fruit Frost Service as zone forecasts are not site-specific, and thus are of minimal use to the growers.

The Fruit Frost Service consists of highly trained agricultural meteorologists who closely monitor weather patterns which could be potentially devastating to frost sensitive crops. Information is gathered on a daily basis from numerous sites and carefully analyzed by meteorologists who then make site-specific forecasts for the various locations within their region. These forecasts are made available to the public through television, radio and telephone recorders.

The Fruit Frost Service is extremely important to the California raisin industry as more than 80 percent of the U.S. production is in a 500-square-mile area in Fresno County, with the remaining 20 percent scattered throughout the state. With such a large percentage of the national crop concentrated within a small region subject to particular weather changes, the California raisin industry depends heavily upon the Fruit Frost Service for accurate and timely site-specific forecasts. It is estimated that in the San Joaquin Valley alone, the Fruit Frost Forecast and Advisory Service saves the industry roughly 10 percent of the crop value through more efficient use of irrigation, reduced and better time sprays and nutrients, and accurate forecasts provided during the harvesting and drying period.

The California Fruit Frost Forecast and Advisory Service covers those areas where frost sensitive crops are grown, from the Northern Sacramento valley to the Mexican border. It is estimated that over $1 billion of the $15 billion California agricultural output is frost sensitive. Further, the estimated annual crop-loss savings in California alone approaches $70 million.

The California Raisin Advisory Board is deeply concerned with the Department of Commerce's decision to eliminate the Fruit Frost Forecast and Advisory Service. This $209,000 program returns millions of dollars in lost crop savings to the producer and consumer each year. In fact, program audits indicate that the Fruit Frost Service has the highest cost-benefit ratio of any division within the National Weather Service. Further, it would be extremely difficult, if not impossible for the private sector to take over this program without an interruption in service. If an interruption in service occurs, the losses to both producers and consumers would quickly run into millions of dollars.

The California Raisin Advisory Board strongly urges this Committee to reevaluate the Commerce Department's decision to end this valuable program. We implore this Committee to recommend continued funding of the Fruit Frost Program until the private sector completes the mammoth task of developing a system for private funding. To this end, we recommend that the program be reauthorized for a minimum of three years at current funding levels with appropriate increases for inflation and employee benefits.

STATEMENT OF HENRY J. VOSS, PRESIDENT, THE CALIFORNIA FARM BUREAU FEDERATION

The California Farm Bureau Federation (CFBF), representing over 94,000 member families and approximately 85% of the farmers in the state, is very concerned about the possible loss of federal funding for agricultural weather, fire weather, and fruit frost programs provided by the National Weather Service (NWS). All three of these programs must be included in one package due to the multiple function of NWS meteorologists in weather programs for agriculture. We feel that weather information is extremely important to farmers, especially those with frost sensitive crops, and that NWS is best equipped to provide this service at this time. We therefore oppose elimination of federal funding for these programs in this legislative session. Our opposition is due to the fact that the industry currently has no other means of obtaining services similar to those provided by NWS, and that both crop yields and quality will be reduced without this production tool.

We also oppose any reductions in federal funding for these programs for the following reasons: (1) the 1982 proposed budget for the fruit frost program, which is of utmost importance to between 1-3 billion dollars worth of California crops, was already reduced by one half and cannot stand any more reductions; and, (2) the classification system for both personnel and monies involved in agricultural and fire weather programs makes it extremely difficult to determine the actual impact of any reductions on specific programs at this time.

The National Weather Service has a long history of support to agriculture. In fact it was a part of the U.S. Department of Agriculture from 1890 to 1940. It is ironic that, after 50 years of administration by an agricultural entity, elimination of weather programs for agriculture would be proposed.

What is actually being proposed? Elimination of a program means "to get rid of, set aside as unimportant, leave out of consideration, or ignore." Since the effects of adverse weather on agriculture and related activities has been estimated by the General Accounting Office (GAO) to cause yield reductions costing the nation as much as $9 billion annually, with direct crop losses alone of $1.6 billion a year, it is hard to believe that any service to curtail these losses is unimportant. While discussing definitions, it should also be mentioned that a reduction means "to lessen in extent, amount, quality, degrade, or bring from a higher to a lower condition." These descripters are exactly what would happen if any reductions were approved at this time. Agriculture may still receive a service, but it may be considerably less effective.

What is agricultural weather information? In California, the NWS takes into consideration elements that characterize the physical environment of the agricultural area and works closely with cooperative extension offices to tailor its services to local production. The following information is provided depending on the time of year and type of crops grown: frost warnings (utilizing numerous weather factors to estimate the degree of potential damage); soil and water temperatures; heat units (amount of time above a minimum temperature); air motion (wind speed, direction, and duration); dewpoint and humidity; type and direction of rains; evapotranspiration (amount of water loss from soil and plants); and degree hours for pest emergence. Farmers of the majority of crops grown in California use these reports to assist them in frost protection, livestock protection, planting, drying, spraying, harvesting, marketing, and irrigating decisions. In water deficit areas of California, accurate agricultural forecasts are essential to a water management program. Both the water district and farmers will utilize these forecasts in requesting the quantity of water needed for irrigation or frost protection practices. Related agricultural businesses need accurate weather information for marketing, processing, transportation, and other operations, such as aerial application of chemicals.

How does the general public and U.S. economy benefit from good agricultural weather information? The consuming public can obtain higher quality food at a lower cost due to increased agricultural production efficiencies. Both the public health and environment can benefit, also. The NWS has estimated that over 40% less sprays have been applied due to timely agricultural weather information. The fact that county governments in California have provided public funds of approximately $30,000 to local fruit frost programs indicates that they see a general benefit to all taxpayers.

The Winter 1982 issue of NOAA, the agency's quarterly publication, provided some additional insight on the weather service's impact on the nation's economy. The article indicated that specialized agricultural weather forecasts ". . . help keep production and operating costs down, factors ultimately reflected in lower consumer prices." Numerous examples were cited on the savings farmers realized from NWS weather information. These savings not only related to increased crop yield, but also in the use of pesticides, electricity, fossil fuel, and water. Agricultural weather forecasts effectively reduced air pollution from burning practices and enhanced both crop storage and transportation ability.

Are agricultural weather programs cost effective? The fruit frost program, which has been in existence for over 60 years, is rated by the NWS as one of its most cost effective programs. In an effort to develop user data to determine program efficiency, the NWS Western Regional Headquarters polled growers, grower organizations, land grant universities, and Cooperative Extension offices about the use of weather information to farmers. The response indicted that at least 10 percent of the value of frost sensitive crops was attributed to good agricultural weather informaton and 3 to 5 percent of the value of the more general grain crops. This conservatively totals around $400 million worth of benefit at a cost to the western region of less than $1 million, or a benefit 400 times the cost. It has been documented that one accurate forecast in 1978 for the freeze in Tulare County, California, saved $25 million worth of citrus. The forecaster involved cost approximately $35,000, a benefit of over 700 time the cost.

Can farmers use public forecasts instead? Although NOAA has indicated that public forecasts will continue to supply weather information, they are generally not accurate enough for farmers, are difficult to convert into farming decisions, and primarily cover urban areas. Also, both the NOAA Weather Radio and Weather Wire have limitations that significantly reduce their usefulness to farmers. Without the specific agricultural forecasts that have proven to be extremely beneficial to farmers, a major shift in production efficiencies could be expected along with increased use of pesticides, water, and energy.

Reduction or elimination of weather programs for agriculture is especially unfortunate at this time since the NWS has been working closely with the USDA over the past few years to develop and enhance expanded weather support to farmers. The GAO has repeatedly suggested that more funding is needed to increase the effectiveness of NWS agricultural programs. The USDA has stated that "improved climatological data forecasts provide tremendous potential for increasing the efficiency of agricultural production and reducing the risks associated with weather." As part of this improvement program, the NWS initiated "Environmental Studies Service Centers," which are now termed "Agricultural Service Centers," with the goal of providing full nationwide agricultural weather coverage. These centers, which are now termed "Agricultural Service Centers," with the goal of providing full nationwide agricultural weather coverage. These centers, which are now slated for elimination, were to serve as coordinating offices for the surrounding areas as follows: Auburn, Alabama (covering Alabama, Florida, Georgia); Stoneville, Mississippi (covering Arkansas, Louisiana, Mississippi, Tennessee); College Station, Texas (covering New Mexico, Oklahoma, Texas); and West Lafayette, Indiana (covering Illinois, Indiana, Kentucky, Michigan, Ohio, southeast Missouri). Offices for Agriculture were also set up in areas of more diverse agricultural production as follows: Yuma, Arizona (northern Arizona); Riverside, California (southern Arizona, California); and Twin Falls, Idaho (working on research with local land grant university).

These seven main agricultural stations are listed to underscore the impact of budget actions on all of the agriculture. The improved agricultural weather programs, or "agricultural advisories," that these stations were designated to coordinate, are in their infancy in many areas. Agricultural advisories were an inmprovement over the older "agricultural forecasts" and the NWS appeared to be heading in the right direction in their reorganization efforts. If the program is reduced or eliminated, the considerable amount of money and effort that has been invested by the NWS, UNDA, and Extension Service over the last few years will have been wasted.

When discussing the impact of NWS agricultrual program elimination or reduction, one must also take into consideration other agencies that are cooperating with NWS besides USDA and Cooperative Extension. In California, the University of California and the California Department of Food and Agriculture have been working with NWS to develop a statewide computerized network, to provide weather data to growers for both irigation use and integrated pest management purposes. In an urban, water dependent state, increased agricultural efficiencies in these two areas are critical to all. The cooperating agencies may find themselves left without the main NWS support base in trying to set up this needed program, and they may have also wasted valuable time and money on a project that cannot be completed.

Our main concern is the need to maintain an assured funding source for quality agricultural weather, fire weather, and fruit frost programs. With the history of budget cut proposals for the fruit frost program in particular, local NWS administrators have had difficulties in both recruiting and maintaining high caliber, experienced personnel. This has had a detrimental impact on overall program quality and, without a vote of funding support, this quality may eventually deteriorate to a point that weather programs for agriculture are no longer functional.

It is especially difficult to discuss reduction or elimination of programs at this time since the actual personnel and dollars devoted to agricultural weather, fire weather, and fruit frost programs are not clearly visible. Historically, the separate fruit frost line item has been underestimated, since additional NWS personnel and money is devoted to fruit frost forecasts by agricultural and fire weather meteorologists in weather service offices. In discussions with NWS regarding program activities, we have found examples where fire weather personel function as fruit frost forecasters for part of the year, and vice versa, which definitely enhances program efficiency but complicates budgetary concerns. We have also found examples of meteorologists classified as "agricultural" who either have not worked on agricultural programs for a number of years, or only devote a portion of their time to such functions.

We are confused by the Department of Commerce NOAA budget, which states that "agricultural programs will be eliminated" but includes $3.518 million and 47 positions devoted to agriculture after budget cuts and baseline adjustments. However, the NWS and NOAA sources have stated that there will be NO personnel for agricultural weather and that the remaining monies and personnel in the agricultural budget will be utilized in other areas. In the midst of this confusion, we would like to pose the following questions to NWS: What portion of the money and personnel in the NWS budget for agricultural weather have actually been utilized in providing the designated function? Why can't the remaining personnel and money in the fiscal year 1983 budget be used for agricultural programs if, in fact, a 47 person, $1.1 million cut is a total program elimination? If, as NOAA has stated, a large portion of these remaining personnel and funds are "cross utilized," why has the agricultural program budget paid their entire bill?

Farm Bureau, with the general policy of support for the President's 1981 Economic Recovery Program, has looked closely into the possibility of industry funding for weather programs affecting agriculture. We have found that the agricultural industry currently lacks a workable plan to totally take on the funding responsibility. The State of California may be facing a serious deficit, the private meteorological industry is small and uncoordinated at this time, and there are significant differences among agricultural industry members regarding both the feasibility and actual administration of user funding.

It should be emphasized to both the Department of Commerce and Congress that NWS programs for agriculture in California ALREADY HAVE a large amount of funding participation by the industry. Other specialized or general NWS programs may not have this type of support and should be closely examined. In 1980, at least $50,000 of the NWS fruit frost program was funded from either local agricultural commissioners' offices or industry contributions. This funding was either in providing offices, computer connections, telephone services, or in-kind assistance. In addition, grower volunteers have actively monitored temperature sensing units on their farms or ranches and reported in to the local NWS office on a daily basis. Many of these grower volunteers have participated in this manner for over thirty years.

Within the last few months, some growers in areas losing their district fruit frost forecaster (due to proposed FY 1982 reductions), began purchasing remote sensing units to compensate for this loss at an investment of over $30,000. However, this computerized program depends on continued forecasts from personnel in the NWS Riverside Office for Agriculture, which is scheduled for closure. Overall, industry funding of the fruit frost program approached half of the $209,000 federal funding allocated in the NWS budget.

Last February, CFBF organized a series of meetings with agricultural interests in California to further investigate the possibility of coordinating industry, local, and private funding efforts to enhance weather programs for California agriculture. Although the meeting participants indicated a sincere interest in some type of additional industry support to provide the stable funding needed for quality programs, some serious problems were identified that may restrict expanded industry financial involvement. It was agreeed that elimination of the program in Fisal Year 1983 would not provide the time needed to fully address these problems.

Without the NWS support base mentioned earlier, the cost to agriculture for a separate program appears prohibitive. The fruit frost program alone has been estimated to cost at least twice as much if weather separately from NWS, and this does not include the NWS and fire weather offices that also provide fruit frost forecasts by agricultural meteorologists. Also, without continued agricultural data gathering by NWS in district and weather service offices, the data base for private meteorological services would be reduced to a non-effective level. Before any additional user funding of weather programs can be considered, we feel that the agricultural industry must determine how the program can be administered as a public body to provide services to all farmers. The current dissemination of agriculutral weather information on public radio, television, and direct phone lines provides the most opportunity for benefit compared to the cost of funding. If user fees were proposed, the problems of how money can be collected in an equitable manner, and how to provide services to each area commensurate to the money collected would also need to be solved.

CFBF has also discussed with NWS the possibility of contracting with it for weather services similar to those currently in operation. This would require both an Office of Management and Budget personnel waiver on the mandated ceiling and approval by the NWS adminsitrators. Although this would definitely be more economical and effective than a separate program, it requires further investigation and in itself would not alleviate many of the problems related to expanded industry funding.

Due to the complications of industry funding and the critical need for agricultural weather information, the California Farm Bureau Federation requests that NWS agricultural weather, fire weather, and fruit frost programs remain fully funded for fiscal year 1982 and fiscal year 1983. In the coming year, further investigation is necessary on both the actual costs and personnel involved in providing agricultural weather services and possisble ways to solve the problems of expanding industry funding.

STATEMENT OF TUNA RESEARCH FOUNDATION, INC.

The Tuna Research Foundation, Inc. strongly supports S. 2401, reauthorization of the Central, Western, and South Pacific Fisheries Development Act. Our members, United States processors of tuna, pack over ninety percent of the canned tuna which is produced in the United States and its territories and possessions.

Senator Inouye's bill will extend the existing $5 million authorization of the Central, Western, and South Pacific Fisheries Development Act (Public Law 92-444, as amended by Public Law 94-343 and Public Law 94-295) for each of the next 3 years. The program established under this Act is designed to assist the economic growth of the Pacific Islands by developing their local fisheries. The Pacific Tuna Development Foundation (PTDF) was established in 1974 to assist in implementing this program. The extension and funding of this Act will allow continuation of the activities of the PTDF.

The PTDF is a unique cooperative effort between the Trust Territories of the Pacific, Guam, American Samoa, Commonwealth of the Northern Mariana Islands, the State of Hawaii, the U.S. tuna industry, and the federal government. As a research and development organization, PTDF has made a significant contribution to the U.S. and Pacific Islands fishing industry by way of exploratory fishing and development of new grounds and harvesting techniques.

A summary of PTDF projects can be divided into five groups:

1. *Exploration.*—These projects are aimed at identifying areas of commercially valuable concentrations of tuna for high-seas United States vessels and at identifying local resources of bait and fish for local fishermen to supply island needs. These projects promote fishery development by:

A. Reducing the uncertainty regarding abundance and seasonal distribution of the resources.

B. Reducing startup costs for commercial developers by providing information on location of regional fishing grounds, expected catch rates, costs and returns.

C. Preventing duplication of research effort by competing local individuals or firms to determine the extent of resources in the area.

2. *Design.*—These projects are aimed at reducing the cost of harvesting, processing, distributing and marketing, or improving productivity, by changing or improving existing gear and methods of fishing.

3. *Training.*—These projects are aimed at improving the viability of fishing ventures by:

A. Improving motivation and productivity of the local work force.

B. Increasing the available pool of fishermen and shore production/processing management personnel.

4. *Marketing.*—These projects are aimed at improving the viability and potential economic return from fishery development by:

A. Improving the potential for fish exports.

B. Improving quality and sales on the local markets.

These projects may improve the balance of trade and level of self-sufficiency of island area economies and relieve the burden of economic support from government.

5. *Administration and Planning of Fishery Related Programs.*—Projects designed to assess the results in the western Pacific and provide guidelines for future development needs as conditions change in the areas involved.

Three major achievements of PTDF programs are outlined below:

1. In 1976 there were no United States albacore tuna vessels operating in the central Pacific north of Midway Island. PTDF, in cooperation with the Western Fishboat Owners Association, conducted exploratory fishing surveys in this area from 1976 through 1978 by chartering United States vessels for survey work. During this period, the existence of a substantial albacore resource was discovered. This encouraged vessels from the United States mainland and Hawaii to develop the fishery without further funding assistance from PTDF. In 1981, a fleet of 65 vessels concentrated fishing efforts in the area. It has been speculated that the potential yield for the area ranges between 16 and 20 million pounds annually, valued at $14.4 million to $23.4 million to United States fishermen.

2. Using preliminary designs of anchored fish aggregation devices developed by the Honolulu Laboratory of the National Marine Fisheries Service, PTDF assisted in funding 3 years of test fishing around these devices in Hawaiian waters. This project established that the system aggregated tuna and other species in commercial quantities thus increasing catches by both commercial and sport fishermen. Due to the success of the devices in Hawaii, PTDF has assisted in funding the installation of similar systems in waters around American Samoa, Guam, the Northern Marianas and Palau.

3. The most significant and successful project undertaken by PTDF has been the development of purse seining for tuna in the Western Pacific. Limited fishing by Japanese purse seiners began in the early 1970's; however, no United States vessels were attracted to the area. In 1976 PTDF chartered three United States vessels with eastern Pacific type nets to conduct fishing surveys in an area south of the Caroline Islands. This initial project established that tuna were plentiful in the area but could not be captured in quantity by conventional eastern Pacific nets and fishing techniques. In 1977, a PTDF team inspected all types of purse seines used by Japanese and United States vessels. PTDF then funded the designing and construction of a purse seine for use in the Western Pacific. During 1977 a one-vessel fishing/survey project was carried out using the new model net. This project, although not without some operational problems, resulted in a catch of two full loads of tuna (1,800 tons valued at approximately $2 million) and was the first successful fishing effort by a United States vessel in the western Pacific area. From a zero catch in 1975, tuna production by United States vessels has improved each year and reached approximately 40,000 tons in 1981. Development of this new fishery has relieved some of the pressure on the tuna fleet caused by regulations restricting operations off Central and South America and benefited both the United States and its Pacific territories.

There is strong competition between PTDF and foreign fishing interests to develop the fishery resources. For example, the Japanese fishery development effort receives full cooperation from its government in funding programs that are many times that provided to PTDF. The Japanese fishing industry has made agreements with the majority of the island areas in the South Pacific to fish within their 200-mile fishery zones and has put up substantial amounts of front money, as well as additional payments based on catch, size of vessel and other criteria. The latest figures available from JAMARC, the Japanese fishery development organization, indicate that its budget is at least five times that of PTDF. The United States Government and the United States Department of Commerce, by reauthorizing and funding this Act, will make a full commitment to the development of Pacific fisheries, the principal resources of the region.

The United States fishing industry has the fishing vessels, the skills, the daring and pioneering spirit to develop the considerable fisheries resource available in the vast Pacific. What is needed is the same kind of commitment and support that foreign competitors are getting from their governments. With that support, there is an excellent chance to reap a tremendous harvest not only of fish but also of economic benefits to the United States and U.S. related islands in the Pacific.

While the Central, Western, and South Pacific Fisheries Development Act authorizes funds for PTDF, no monies have been appropriated. Rather, the U.S. Department of Commerce has chosen to fund PTDF efforts through Saltonstall-Kennedy (S-K) funds. Since the future of S-K funds is uncertain, extension and funding of the Central, Western, and South Pacific Fisheries Development Act is even more important. Continued PTDF activities are an investment in the future. Expansion of the U.S. fishing industry in the Pacific could support the Pacific Islands' economic independence and stability through increased employment, expanded trade, and industrial growth.

The Tuna Research Foundation is confident that if the Central, Western, and South Pacific Fisheries Development Act is reauthorized as provided for in S. 2401 and appropriated by the Department of Commerce, we will find new wealth for our nation as well as our island dependencies with the production of a naturally renewable resource from the ocean.

STATEMENT OF THE INTER-ORGANIZATIONAL COUNCIL OF ST. PAUL AND ST. GEORGE PRIBILOF ISLANDS, ALASKA

I. THE PRIBILOF PROGRAM AND BUDGET

Home to some 800 Aleuts, an estimated 1.4 million migratory fur seals[1] and 2.8 million nesting birds, the Pribilof Islands lie in the South Bering Sea, about 200 miles north of the Aleutian Island chain. Since the purchase of Alaska from Russia in 1867, the U.S. Government has managed both the fur seal and the lives of the Aleut residents of the island.[2] Although the U.S. Government's treatment of the Aleut people was judged in a recent decision by the Indian Claims Commission to have been unfair and dishonorable, its management of the fur seals in recent generations has been heralded by scientists and environmentalists to be an exemplary model of wildlife management.

The success of the fur seal management program is attributed, in part, to the willingness of Japan, Canada, the Soviet Union and the United States to agree, via an international convention similar to a treaty, to coordinate their management with the common purposes of limiting the harvest to a number that the herds could sustain in perpetuity and to discontinue and prohibit "pelagic sealing," the inefficient practice of harvesting fur seals on the high seas. The government's moral and legal failure in dealing with the Aleut residents may have directly resulted from the priority given to its managing of the fur seals by treating Aleuts as "slaves of the harvest" whose justification for being has been as a cheap source of available labor to carry out the harvest of seals.

The recent (June 1981) U.S. Senate confirmation vote of 94 to 0 to extend the convention another 4 years reflects both the national interest in and the commitment to the continual management of North Pacific fur seals.

The Pribilof Island (fur seal) Program, currently managed by the National Marine Fisheries Services (NMFS), spent approximately $5.3 million in fiscal year 1981. According to the terms of the Fur Seal Act of 1966, NMFS not only manages the seal harvest, but also provides essential services to the Aleut residents, who as employees, actually perform the harvest. These expenditures directly comprised an estimated 65 percent of all income coming into the islands and indirectly contributed an additional 15 percent. On St. Paul Island the 1979 figures demonstrate that NMFS and school employment accounted for $2,005,650.00 of the total $2,685,366.00 salaries and wages paid on the island.

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[1] The North Pacific fur seal uses the beaches of the Pribilofs for a birthing and breeding area. The animals arrive during the early summer and accomplish both purposes in a relatively short time, then depart for warmer marine climes.

[2] The Aleuts were originally transported to the islands by the Russians in the eighteenth century to harvest the fur seals. Since the purchase of Alaska the Federal government has continued to treat the Aleuts as a necessary captive labor force.

Efforts to reduce the island's dependence on NMFS and the fur seal harvest are shared by all concerned—Aleuts and State and Federal agencies. Plans, commitments, and programs toward that end have been prepared, secured, and partially achieved. However, any reduction in the NMFS budget below $5.3 million each fiscal year would destroy the islands' economy, forcing abandonment of the islands by the young and able, which in turn would jeopardize both the fur seal harvest and U.S. compliance with the terms of the Interim Convention on Conservation of North Pacific Fur Seals. Such a precipitous reduction, if enacted, would destroy all Federal, state, and local efforts to wean the islands' economy from the NMFS program, promote the transfer of the harvest into the hands of the private enterprise and develop the important fisheries resource which is located in the adjoining waters and presently harvested by foreign fishing fleets.

In the following pages we discuss the problems which have contributed to the administration's decision to cut the Pribilof Island Program, the goals and plans that have been formulated to facilitate the reduction of the program and the diversification of the islands' economic base, and the tremendous cooperation between Federal and state agencies and the local Native village corporations.

II. THE PROGRAM'S MOUNTING FINANCIAL TROUBLES

Managing the fur seal harvest has, until recent years, been a profitable venture. As late as 1960 the harvest yielded a profit of over one million dollars. However, profits continued to dwindle throughout the decade to the point where, by 1970, costs exceeded revenues, and the Pribilof Island Program incurred its first deficit. Throughout the 1970s, revenues fell and costs increased, resulting in larger deficits each successive year. By 1980, the annual program deficit had reached four million dollars. Even though one could argue that the accumulated profits from the fur seal harvest still far exceeds the deficits of recent years, the causes underlying this ominous trend need to be identified if the program is to be put back on a sound financial basis.

The underlying causes of this trend from profits to losses appear to be straightforward. Revenues from the program are a function of quantity and price; that is, the numbers of seals harvested and the price that seal products command in the marketplace. Expenditures are also a function of the price of labor and capital and the attendant services and benefits that the program furnishes its workers and the community.

Plundering of the fur seal herds by pelagic sealers in the late 1880s reduced the total population of fur seals from about 2.5 million to a low in 1911 of 250,000. However, prudent management under the Fur Seal Treaty of 1911 and subsequent amendments thereto have enabled the fur seals to come back, increasing to an estimated 1.25 million. Such success makes this one of the world's most successful migratory wildlife management programs in the world.

This is not to suggest, however, that the number of seals harvested has been either steadily increasing or relatively stable. In fact, by 1956, scientists determined that the size of the fur seal population had grown too large and initiated a 10-year reduction program.

Annual harvest levels averaged approximately 73,500 throughout the fifties, and 64,500 in the sixties. Scientists are continuing to study the population dynamics of fur seals and the effects that seals have on other species in the Bering Sea, particularly pollock, the main food staple for the fur seals. Current thinking suggests that an annual harvest of approximately 25,000 to 30,000 seals can be sustained by a stable population base of 1.25 million seals.

Apart from the motivations for the varied harvest levels, only half as many seals were harvested in the seventies as in the fifties and sixties. Because revenues are derived from the sale of sealskins, seal meat, and other by-products, it follows that unless the costs of the Pribilof program were reduced in proportion to the harvests, or real prices of sealskins and related products were doubled, then profits will continue to be consumed by the rising costs.

Declining harvest levels was not the only factor eroding the program's profitability. Prices for the tanned sealskins actually decreased over the past three decades.

Sealskin prices declined through the sixties, and by the seventies the rate of decline rapidy accelerated. By 1979 the real net value of a sealskin had dwindled to one-sixth of its 1960 value.

Although there has been no thorough research on this issue, the loss in sealskin value is attributed to changes in high fashion tastes. In years past, finished sealskin garments were regarded as a luxury item and commanded high prices. Today, however, demand for sealskins has been reduced by the cultivated social stigma attached to wearing garments made of natural skins from endangered species. Even though seals are not an endangered species, they have become regarded as such, partly because of propaganda campaigns designed to halt the seal harvest.

Undoubtedly, other factors also influence the world of high fashion; however, prohibitions placed on NMFS by selected interest groups, combined with the absence of any financial incentive to market sealskins for maximum value, led to the seller's passive acceptance of "fashion" changes rather than an aggressive marketing effort to influence them.

Escalating costs of the Pribilof Program also contributed to the erosion of profits. Throughout most of this century NMFS or its predecessor (the Bureau of Commercial Fisheries) managed not only the fur seal harvest but also served as the landlord of the islands. All land, housing, and facilities were owned and maintained by NMFS. Local residents were like resident workers living in company quarters. As poor housing and community facilities became increasingly exposed to public scrutiny, NMFS was pressured into providing minimum facilities and services. Indeed, passage of the Fur Seal Act of 1966, referred to as the "Bartlett Act," was largely the work of Alaska's Senator Bob Bartlett who persistently pushed the Bureau of Commercial Fisheries (now NMFS) to improve its services to the local residents. However, with this upgrading of service to the islanders and reclassifying of Aleut workers to civil service status came additioal costs in initial capital outlays, increased salaries and wages, and in continued operation and maintenance costs.

Compounding the cost increase of expanded and upgraded facilities and services was the accelerating impact of inflation in the 1970s. Island wages and salaries paid by NMFS have rapidly escalated along-side inflation. Similarly, the costs of transporting products and personnel to and from the islands and of purchasing fuel for home heating and diesel-fueled power generators have skyrocketed throughout the seventies, NMFS expenditures swelled by fiscal year 1982 to a total of 5.3 million dollars. However, it is important to note that after adjusted for inflation, the NMFS fiscal year 1982 budget is less than it was in 1967.

III. ACHIEVING SOLVENCY BY ECONOMIC DIVERSIFICATION

Pribilovians recognize the problem faced by the U.S. government in dealing with the rising deficit of the Pribilof Program, particularly during this period of fiscal constraint, and we are committed to solving it. All of the major organizations on the two islands of St. Paul and St. George have joined together in an Inter-Organizational Council (IOC) dedicated to the purpose of diversifying the economic base of the islands.

Although it is premature to assert that this trend of declining prices and increasing costs can be totally or immediately reversed, we feel confident that a harvest, processing, and marketing fur seal operation run by private enterprise, with profit-making as its incentive, can extract maximum value for the sealskins from the marketplace.

We are also confident that many of the service and facility costs presently borne by NMFS can, if properly planned, be gradually transferred to other entities. To do so, however, requires that the islands diversify their economic base, which in turn will provide jobs and incomes for individuals to pay for the services they receive and provide the local governments with a tax base and source of public revenues. It is toward this end that the State of Alaska is actively working with the islands to develop an infrastructure for economic development that can assume or offset the costs of some public services provided by NMFS. This effort includes, for example, a state subsidy for power generation and the transfer of ownership and maintenance of the local airstrips. It also includes the construction of a boat harbor in order to allow the islands to benefit from the adjoining fisheries resource.

Table 1 summarizes accomplishments of various Native and government organizations on the islands during the past 2 years. Through the active cooperation of the State of Alaska and Federal agencies and the commitment of our two local Native village corporations to the development of the islands' economy, we are well on our way toward developing a diversified economic base for the islands. Approximately 6.6 million dollars has been committed toward this purpose in 1980-81 and an additional $17.9 million is planned for 1982-83. (A more detailed description of these projects attached as exhibits.)

Surrounded by one of the world's richest fisheries, we are confident that careful planning can expand the Pribilof's role in the exploration of these valuable resources. To do so, however, requires that we develop the basic infrastructure to support fishing, fish processing, and marine support. A breakwater, harbor, dock, and related facilities are all absolutely indispensable. Similarly, developing a shore-based industry requires land-use planning to determine site locations, sources of water and power, systems to dispose of wastes, etc.

TABLE 1.—PROGRAMS CONTRIBUTING TO ECONOMIC DIVERSIFICATION OF PRIBILOF ISLANDS

Entity	Activity	Effective date(s)	Results/Action
Federal:			
Army Corps of Engineers	A boat harbor feasibility study for St. Paul	1981	Recommended federal participation totaling $9,115,000 to construct mooring basin, breakwater with roadway, and dock.
National Marine Fisheries Service	Technical and Professional training for Pribilof residents	1981–82	$50,000 annually.
Bureau of Land Management, Alaska Outer Continental Shelf Office.	Studies on petroleum development in St. George Basin	1980–81	Baseline data development.
North Pacific Fisheries Management Council	A feasibility study of a live hair crab industry for St. Paul	1980	$10,000—Development of shipment technology; location of crab concentrations
Bureau of Indian Affairs	A feasibility study and development plan for development of a hair crab industry on St. George.	1980	$100,000.
U.S. Geological Survey	Fresh water resource reconnaissance	1980	Assessment of fresh water availability for fish processing.
State:			
Department of Transportation & Public Facilities	A community impact analysis and engineering design for a small boat harbor at St. Paul.	July 1981 to December 1981	$350,000—In progress.
	An engineering study to extend the St. Paul airstrip	1981–82	$70,000—In progress.
	A design study and initial construction of a small boat harbor at St. George.	April 1981 to October 1982	$3,000,000—Preliminary design completed.
	A feasibility study to extend the St. George airstrip	1981–82	$150,000—In progress.
	A grant to construct a mobile boat launching facility at St. Paul.	1981–82	$137,000—Design completed for construction.
Department of Commerce & Economic Development	A study of the feasibility of tourism at St. George	1981–82	$25,000.
Department of Education	Construct a vocational education facility at St. Paul school	1982	$115,000—Design completed for construction.
Department of Community & Regional Affairs	Municipal grants for capital facilities at St. Paul and St. George.	1981	$323,000.
Alaska Humanities Forum	Grant to develop plan for Community Development monies of ICC award.	1981	$20,000—In progress.
State—Pribilof School District	A feasibility study of wind power and heat exchangers	1982	$50,000.
Local:			
St. George Village Corp., Tanaq	Joint venture with Taiwanese firm to produce Pacific cod and flounder for marketing in Far East.	1981	$250,000—Training on board factory ship; funds to purchase fishing vessels.
St. Paul Village Corp., Tranadgusix	Purchase of two small 24-foot longliner boats to engage in small boat fishing.	June 1981	Capital Investment: $132,000. Yearly Investment: $70,000. First commercial fishing operation and training.
	The processing and marketing of seal meat and seal by-products.	1981	$495,000/$190,000—Use established for meat.

The processing and marketing of reindeer antlers	1981	$60,000/$85,000—Increased employment.
A tourist hotel and restaurant at St. Paul	1981	$260,000/$120,000—Expansion of tourism employment.
Local property investments consisting of a four-plex and duplex at St. Paul.	1981	$60,000/$15,000—Reduction of housing shortage.
Conversion of existing facility to processing and storage of halibut.	1981	$34,000/$3,000.
Programs in management training	1979–81	$10,000—In progress; areas being covered: grants writing, tourism operations, restaurant management, administrative management, bookkeeping, supervisor management, fisheries.
A tidelands survey at Chernofski	1981	$10,000—Survey prepared for tidelands application.

Note: For Further Detail, See Appendix A.

Work on the foundation needed for the economic diversification of the islands is well underway, with construction of several critical projects to begin this spring. However, we will require a minimum of 3 to 5 years to design and construct these basic facilities. Our development timetable is simply subject to real-world time constraints; there are limits on how fast we can prudently accelerate the planning and development process.

We are also constrained by the realities of world markets, the availability of capital, and limited managerial talents. We are carefully exploring the feasibility of continuing to invest our own capital in business ventures related to economic diversification. We have successfully increased the value of our seal byproducts operation, and this summer we initiated the first phase of our small-boat day-fisheries development plan. As a means of leveraging our own limited capital resource and gaining the expertise we desperately need, we recently entered into joint venture agreements to process and market hair crab.

As shown in Tables 1 and 2, we are proceeding methodically and carefully toward a comprehensive economic diversification program. We subject each potential business venture to a rigorous investigation to determine its feasibility. Business development plans are thus prepared and scaled to grow as our capital availability and management capabilities expand, both of which are seriously in short supply.

In short, we have marshalled all of our own human, institutional, and capital resources and have dedicated them to the economic diversification of the islands as a means of offsetting an eventual reduction of NMFS expenditures on the islands.

It should be noted that the "Pribilof Islands Services Plan," prepared for NMFS in 1979-80, led us to believe that the government was also committed to a phased reduction or withdrawal of the NMFS program over 10 years. Now we are faced with the reality of a telescoped 5 year withdrawal. We, however, have thrown all of our resources into economic diversification. Despite the seeming imprudence of putting all of our "eggs into one basket" (investing all our resources in the islands), we feel that these are not normal circumstances. Indeed, we recognize that the very survival of our communities and culture is at stake.

TABLE 2.—PROSPECTS TO FURTHER THE ECONOMIC DIVERSIFICATION OF PRIBILOF ISLAND

Entity and Activity Pending or in Preliminary Stages of Negotiation

Federal

Department of Interior.—Bird cliff exchange—$7,500,000 total; $2,000,000 for fiscal year 1982.

Dept. of Agriculture, Agricultural Experiment Station.—Retain a ranch consulting firm to manage reindeer herd on Umnak Island.

National Marine Fisheries Service and/or Bureau of Indian Affairs.—Secure transitional planning and economic development grants and secure funding for small boat demonstration project.

Indian Claims Commission award, 20 percent community development monies.—Obtain release of monies from the Secretary of the Interior.

U.S. Congress.—Secure a waiver to the Merchant Marine Act to allow American President Lines to stop at Pribiliofs on its international routes.

Federal Aviation Administration.—Install an Instrument Landing System at St. Paul airport, 1983.

Economic Development Administration.—Halibut processing and marketing pilot project.—$65,000.

State

Division of Energy and Power Development.—Secure financial assistance for local power utilities with diesel-fueled generators.

Alaska Legislature.—St. George desalinization plant to provide readily accessible drinking water to all residents and secure funding for semipermanent boat mooring and launching facilities at St. Paul

Department of Transportation and Public Facilities.—Comprehensive land use plan for Chernofski as a Bering Sea marine support base.

Department of Community and Regional Affairs.—Comprehensive land use plans for St. George and St. Paul.

University of Alaska.—Water resource assessment in Chernofski.

Local

St. George—St. Paul.—Feasibility analysis of assumption of fur seal harvesting, processing, and marketing and a joint venture in halibut fishing, processing, and marketing.

St. Paul Village Corp., Tanadgusix.—A joint venture with Fouke Fur Co. to process fur seal skins; semipermanent installation of a floating fish processing facility which later could become shore-based; a long-term sales contract with a Japanese firm to process and market hair crab; contract a vessel to identify and chart profitable fishing grounds; development of a long-range fishery development plan; retain a consultant to research and develop cottage industries, such as a local arts and crafts industry; and a long-term agreement to provide seal meat as animal feed.

Aleut Corp.—Conduct a study on the feasibility of development aquaculture on St. Paul Island.

St. George.—Incorporation as a Second Class City or become recognized as an appropriate village entity.

Other

International Pacific Halibut Commission.—Develop separate Pribilof halibut fishery zone and secure funding for halibut population research utilizing large commercial craft with local persons training onboard.

Exxon Oil Co.—Develop helicopter support facilities on St. Paul.

IV. ALTERNATIVE MEANS TO A COMMON END

We share the government's interest in managing and harvesting the resources of the Bering Sea at their optimum sustainable level. We, much more than the government, depend upon the wisdom and outcome of such management. Even our new fishing ventures are a part of and influenced by the management of this rich ecosystem.

We recognize and accept the necessity for transferring many of the public services that NMFS presently provides to other entities, but we also know that unless these other entities have a revenue base themselves there will be no public services, no community, and no fur seal harvest. What we ask for is the opportunity to plan and execute a planned withdrawal of these expenditures from the NMFS budget.

The State of Alaska is interested and willing to help us. The infrastructure grant funds that they have already awarded is clear evidence of their willingness and commitment to help us reduce the NMFS budget.

But the key to our success lies in the economic diversification of the islands' economy. To achieve this diversification will take both time and money. We are investing everything we have in projects designed to contribute to this single goal. We are hopeful, but we need time and support. Most of all we need a fiscal year 1983 budget for the Pribilof Island Program that will maintain crtical services and island employment at current levels.

Through cooperation, we feel that private enterprise can eventually conduct the fur seal harvest at no cost to the government.[3] But if we are to achieve this goal, many changes and investments must be made—some by the islanders and the village corporations, others by the State of Alaska and the Federal Govenment.

We offer several specific recommendations to the U.S. Congress as an initial step in working toward our goal:

1. Appropriate funds for a maintenance fiscal year 1983 budget for the Pribilof Island Program at a level of $5.7 million with the requirement that these funds be earmarked for Pribilof Programs and specifically prohibit allocation to general overhead of NMFS.
2. Authorize and appropriate funds to initiate a planning effort for transferring the Pribilof Island Program to private management.
3. Direct NMFS to upgrade its existing facilities and equipment on St. Paul to acceptable standards so that development may proceed.
4. Direct an appropriate agency to form a task force to coordinate Federal efforts and aid in promoting the economic development of the Pribilof Islands, particularly in the areas of tourism and fishery development.

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[3] Not including NMFS research and related administrative costs.

Bertagna Orchards, Inc.,
Chico, Calif., April 9, 1982.

Hon. **Bob Packwood,**
U.S. Senate, Chairman, Senate Committee on Commerce, Science and Transportation, Washington, D.C.

Dear Senator Packwood: We in agriculture are alarmed to hear of the discontinuance of funding for both the Agricultural Weather Alert Service and the Fruit Frost Service in California. The following are a few reasons and arguments that will hopefully help you understand why these services are vital to todays agriculture.

In the Spring the Fruit Frost Service reports are a vital part of our farming management operation. The information we recieve organizes our daily planning and our night alert. Also the Agricultural Weather Alert Service indicates to us the type of circumstances we still have today and in the next few days detailed and specific for our area. Is is going to be a drying North wind, foggy mist, cloudy and rain all has a great factor on our crop. Not only does George Overhalser indicate what I mentioned above, he also indicates what the farmer needs to know specifically. As an example of mentioning you might spray because it is good Brown Rot fungus weather. To the normal citizen that doesn't mean anything, but to the farmer he goes to check to make sure he is covered protection.

An example in the summer use of these services is knowing of coming winds and rains. Knowing the quanity of rain coming, may save an irrigation or a hay crop. Know a strong wind is coming may save alot of trees from blowing over. Because you would stop irrigation so the roots would not be in soft soil and blow over.

During the harvest season the Agricultural Weather Alert Service is vital to our operation. It guides us on how soon we harvest certain varieties of our crop. We work long into the night to bring the almonds in from the field, when it is forecast rain the next morning or a heavy dew. This allows us to be more efficient and our equipment to be more effective, which means we stay in business longer. Much more profitable management decisions can be made by the interaction with area profitable management decisions can be made by the interaction with area specific, user oriented specific three to five day forecasts from the Agricultural Weather Alert Service and Fruit Frost Service. In todays world the government should realize the farmer needs all the tools and technology it can get, to help feed our country as well as others. What helps balance the trade more than Agriculture. That in very brief form is why we urge you to help keep the Agricultural Weather Alert and Fruit Frost Services in full operation.

Sincerely,

Bertagna Orchards Inc.

American Farm Bureau Federation,
Washington, D.C., April 7, 1982.

Hon. **Bob Packwood,**
Chairman, Committee on Commerce, Science, and Transporation, U.S. Senate, Washington, D.C.

Dear Senator Packwood: The American Farm Bureau Federation is the nation's largest general farm organization with a membership of over three million families in 48 states and Puerto Rico. Farm Bureau members produce virtually every type of commodity grown on a commercial basis in the country. Many Farm Bureau members, particularly those who produce commodities with sensitivity to changes in weather conditions, have benefited by the agricultural weather services of the Department of Commerce's National Oceanic and Atmosphere Administration. This letter pertains to funding levels for the agricultural weather service program for fiscal year 1983.

The fiscal year 1983 budget summary for the Department of Commerce, NOAA, indicates that the agricultural weather services program is being elminated. However, a closer look reveals that the line item for agricultural weather services, under speciallized environmental services, remains with a funding level of $3,518,000 and 45 staff positions. These figures represent a decrease of $1,260,000 and 43 fewer staff positions for agricultural weather services from fiscal year 1982.

The decrease in funding and staff results in the closing of four agricultural weather service centers and three weather service offices and the elimination of the fruit frost program. Farm Bureau is very concerned that the funds and staff which remain for fiscal year 1982 will not be dedicated to providing those weather services which are essential to agriculture.

Weather is at the heart of farm and ranch production and marketing activities. Farmers and ranchers are very much aware of their need for timely and accurate weather information. At the same time, they are concerned about the necessity to reduce federal spending.

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At the March meeting of the American Farm Bureau Federation Board of Directors, the Board approved the following recommendations with regard to the agricultural weather services program.

That the AFBF support adequate funding for the Agricultural Weather Service to maintain needed agricultural weather services for production and research use.

That (1) Private forecasting be encouraged in the areas where forecasting is needed; (2) AFBF work to ensure that the data bases from the National Weather Service be retained and made available to private forecasters; and (3) Weather needs of producers be determined and conveyed to the National Weather Service.

These recommendations reflect the overall concern of farmers who depend on accurate weather information to determine optimum times for planting, fertilizing, spraying, and harvesting, as well as alerting growers to the need for special protection of commodities such as citrus groves.

Farm Bureau recognizes and supports the need to reduce the growth of federal spending even in areas that are viewed as helpful to farmers and ranchers. However, we believe that it is ill-advised to eliminate or drastically reduce federal funding at this time for the Agricultural Weather Service Program, considering that the fruit frost program was reduced by 50 percent last year.

Farm Bureau recommends continued funding or personnel reallocation at a level sufficient to perform vital agricultural forecasting services until private firms are in a position to provide the service.

Farm Bureau continues to emphasize that, until Congress and the Administration move to reduce spending for federal entitlement programs, federal spending cannot be controlled.

Thank you of consideration for our comments. We ask that they be made a part of the hearing record.

Sincerely,

JOHN C. DATT,
Secretary and Director.

CHICO, CALIF., *April 12, 1982.*

Hon. BOB PACKWOOD,
U.S. Senate, Chairman, Senate Committee on Commerce, Science, and Transportation, Washington, D.C.

DEAR SENATOR PACKWOOD: We in agriculture are alarmed to hear of the discontinuance of funding for both the Agricultural Weather Alert Service and the Fruit Frost Service in California. We believe it will be impossible for us to establish a private funding mechanism in time to prevent the demise of these fine programs.

We are seriously considering a joint powers type of agreement between the Weather Bureau and a quasi-public body to act as a funding interface between the government and the ultimate user.

The following reasons and arguments, hopefully, will help you in your deliberations next Monday. I have been working with 23 farmers as a ad hoc committee for agricultural weather during the past seven years. I am also a member of the California Farm Bureau Statewide Task Force on agricultural weather. I am a family type farmer producing almonds and walnuts on our family owned 200 acre farm.

Our view can be expressed by addressing three areas of concern:

1. Private weather services.
2. Unique characteristics of agricultural weather products of the Weather Service.
3. Inherent disadvantages of services provided by general interest weather entities.

PRIVATE WEATHER SERVICES

We have sampled existing private sources of weather and found them to be very inaccurate and unresponsive to our unique needs. One member of our group has paid thousands of dollars for area specific forecasts during which time he attempted to improve their reaction to our specific needs but unfortunately, he was unsuccessful. My only hope for the future of private weather services to California would be that most of the people who are now employed by the Weather Bureau in their Ag. Weather and Fruit Frost Services would resign from government services and regroup under the same individual managers as before but as a private, for profit, service to agriculture. We have discussed this with these weather personnel and they feel such a program would be very effective and responsive to agriculture. We would prefer, however, to leave these people on the government team in generally the same offices but funded through a quasi-public agency deriving revenues from private agricultural sources.

UNIQUE CHARACTERISTICS OF AGRICULTURAL WEATHER PRODUCTS OF THE WEATHER BUREAU

The agricultural weather alert system was designed during a period of time during which farmers and the government Extension Agents and Weathermen cooperated in defining specific geographic areas for which the forecast would be specific in weather event detail. Specific weather event details were delineated by the development of a Weather Crop Calendar. This calendar defined which crop and agricultural management decision could be effectively made if informed of which specific weather events three to five days ahead of time. These events were modified for every month of the year in our four county alert area. During the second year of the actual implementation of this forecast system both the weather people and the farmers become aware of the need to synchronize the calendar to reflect significant differences from year to year because of the fact that most years crop progression is earlier or later than previous years. One farmer suggested that since the Agricultural Commissioner in every county of California is required to comment on weather impact and seasonal variations in a report to the headquarters of the State Department of Food and Agriculture every week of the year, he could share this information with the Agricultural Weather Alert System. This arrangement was subsequently implemented to everyone's satisfaction.

This agricultural alert format started with our specific area forecast five years ago and has since expanded to 18 areas of California plus numerous specific area forecasts throughout seven additional western states.

Farmer acceptance, interaction, use, and appreciation has been much more profound and widespread than any program during the entire history of the Weather Bureau. There are key reasons, in my opinion, for this heartwarming success story.

First, and most important, we have a staff of very practical and experienced mature licensed meteorologists who cared enough to contact farmer users to find out what information is important. (Example: In fungus control we need to know when a plant will be wet and for how long at what temperature. Will we have dry wind behind a rain storm or will we have warm balmy winds followed by additional dew or precipitation during the next several days? Forecasts simply concerned with rain or no rain are not enough.)

Secondly, we needed farmers willing to take the time to communicate often directly with the weather staff.

Thirdly, we needed a delivery system outside of commercial radio stations. We have met with weather people together with radio people and all agree that minimum level ag weather forecasts are far too verbose for general audiences that constitute that vast majority of radio users. We use taped weather record-a-phones plus some radio stations. Computers will be next.

Any change of funding source must not damage or disorganize this fine relationship that has been so effective during the past six years.

INHERENT DISADVANTAGES OF SERVICES PROVIDED BY GENERAL INTEREST WEATHER ENTITIES

Farmers do use accurate (considering the state of the art) general forecasts provided by the media well. Much more profitable management decisions can be made by the interaction with area specific, user oriented specific three to five day forecasts.

The broadcast media is based on a general audience with a very impatient and short attention span. Broadcast areas are far too great and therefore short, a forecast must be very general for the three to seven significant weather areas often covered by radio or T.V.

It can be argued that general weather as well as specific agricultural weather is inherently the most cost efficient and management resource efficient when performed by the Federal Government.

We suggest, at least, that the government very gently guide this fine organizational structure and fine dedicated personnel into a modified Federal-quasi-public funding organization. To do this without serious irretrievable damage almost certainly dictates that the Federal program be fully funded by Congress for at least the fiscal year 1983.

Sincerely,

EARL N. DECKER.

FLORIDA FARM BUREAU FEDERATION,
Gainesville, Fla., April 15, 1982.

Hon. BOB PACKWOOD,
Chairman, Committee on Commerce, Science and Transportation, U.S. Senate, Washington, D.C.

DEAR SENATOR PACKWOOD: The Florida Farm Bureau is our state's oldest, largest, general farm organization with a membership of over 94,000 member families. Approximately 96 percent of all farmers and ranchers in our state are members of our organization. Our membership consists of farmers and ranchers who produce virtually every type commodity grown on a commercial basis in our state.

We are greatly concerned over the recent proposal by the Department of Commerce to eliminate agricultural weather service and fruit frost support service.

This proposal, as presented and outlined by Dr. John V. Bryne, Administrator, NOAA recently, attempts to justify this action by saying that (1) this service is serving a single interest, limited population group and should not continue at taxpayer expense, and (2, this service can be provided by the private sector.

Please allow us to address these statements as well as express other concerns in an effort to point out the necessity of retaining this vitally needed service.

You should understand first, however, that we wholeheartedly support reduced government spending, balanced budget, and elimination of federal waste and abuse of taxpayers' dollars. We support the 20 percent reduction in U.S.D.A. 1983 budget as well as holding the line on increased commodity price support programs, etc.

We supported the 50-percent reduction in staff last year of the National Weather Service station in Ruskin, Florida. We have supported in every case "cutbacks" when and where necessary in order to reduce federal spending and "federal fat." I say all this to demonstrate that we are not hypocritical in our request for retention of this service nor are we for cutting everyone else and exempting agricul.

Cash receipts from marketing of agricultural products in Florida total more than $4 billion. Coupled with the purchase of over $8 billion in goods and services by agricultural producers and agricultural-related enterprises, agricul becomes a rather substantial contributor to our state's economy ($12 billion). Florida agricul employs 112,000 on-farm workers and numerous thousands of off-farm workers who actively engage in processing, packaging, retailing, etc. Close to one-fourth of Florida's work force is employed directly or indirectly by agricultural concerns. Florida ranks eleventh in the nation in total farm cash receipts.

FLORIDA FARM FACTS

95 percent of the nation's orange concentrate is grown and processed in Florida.

Florida ranks No. 1 in nation in production of snap beans, cabbage, tomatoes, sweet corn, cucumbers, egg plant, escarole, green peppers, watermelons, foliage plants, sugarcane, honey and quarter horses.

Florida ranks No. 2 in many, many other fruits and vegetable crops.

These facts are presented not in a boastful manner, although we are proud of their contributions, but rather to indicate the magnitude of impact upon a very, large industry who depends upon timely, accurate weather services.

The function of the National Weather Services station in Ruskin, Florida is vital to Florida agricul. Its value has been demonstrated again and again as frost and freeze threatened Florida's citrus and vegetable crops. It has an even greater fu role in Florida's vast farm and agribusiness structure.

Forestry. The Ruskin station also plays a key role in the protection of Florida forests (17.1 million acres) by providing information constantly on the tempera and relative humidity and other weather conditions which help gauge the danger of fires and assists the Division of Forestry in making preparations during fire seasons. Continuous weather mapping also assists our foresters in keeping tabs on forest insect activity and in timing the application of pesticides.

Ground link station.—The Ruskin station also is the ground link in provision of weather information gathered by satellite which is being tested by the University of Florida's Institute of Food and Agricultural Science in five Florida counties this year. This system is the fu promise to make statewide weather information readily available through your television set. If the Ruskin station were to be closed, the weather service would have no way to connect ground-station weather information with the satellite data to complete the mapping project.

Fruit and vegetables.—Only the National Weather Service has the capability, training and equipment to adequately supply the service necessary to help growers minimize losses due to freeze damage. Without early warning of damaging temperas, growers could lose millions of dollars in a single night. Fred Crosby, Chief Meteorologist at Ruskin, said, "In the January 1977 freeze, the information we provided saved citrus growers in Lake and Orange Counties al between $5–7 million." (Lake and Orange are only two counties of approximately 25 that produce large volumes of citrus.) The December freeze of 1981 and the January 1982 freeze would even exceed these figures.

Ruskin gives out special reports every two hours during severe weather periods . . . information on wind, clouds, projected low tempera hours, duration periods, etc. This timely, critical information allows growers to make their decisions.

Grower actions as a result of timely weather information.—Growers make important decisions based on Ruskin reports. These decisions often save Florida farmers millions of dollars per night.

(1) Strawberry producers, fern growers and other horticulturalists depend on Ruskin information to determine the exact time to turn on irrigation spray pumps . . . this represents thousands of dollars to the grower who can wait and not turn on water before necessary.

(2) Citrus growers save millions by saving water, energy and manpower by waiting until the critical time to start sprinklers or turn on powerful wind machines or lighting expensive petroleum filled smudge pots.

In addition to the regular weather advisories, the Agricultural Weather Service provides information on soil temperatures, wind speed and velocity, evaporation rates, vegetative wetting, etc. Careful analysis of soil temperature and moisture measurement are needed to establish appropriate planting times. Precise analysis of wind speed and direction are essential for agricultural aviation to minimize the application of costly agricultural chemicals. In this light, one unexpected rainstorm following a pesticide application could result in losses of over a million dollars in the Mid-South states.

Integrated Pest Management Programs (IPM) are just getting off the ground at the state level, and the weather data, which is an important element of such programs, will not be available if the shutdown goes through.

Representative David Bowen (D., Miss.) said recently, "that studies conducted in Mississippi indicate that farmers have been able to achieve an average of 7 percent greater cash farm receipts as a result of eliminating preventable weather losses through services provided by the NOAA Agricultural Weather Service there." We have not conducted such a study in Florida, but from experience I would conservatively estimate the percentage would be greater than 30 percent in Florida.

In rebuttal to the proposition that this service is serving a single interest group (agriculture), I submit the reasoning that agriculture, our nation's largest industry, our nation's largest employer, our nation's largest contributor to the surplus position of our international balance of payment (Farm exports far exceed imports by $28 billion) and the fact that agricultural productivity allows us to have the largest quantity and quality of wholesome, fresh food at the lowest price of any country in the world (16 percent of disposable income goes for purchase of food) and this is achieved by only 3 percent of the population. Because only 3 percent are such efficient producers, this allows the other 97 percent to pursue vocations of their own interest without having to worry about from whence their food will come.

Without a strong, healthy agriculture, 25 percent of the nation's employed work force would be unemployed and on government dole. The 6 million farmers, ranchers and growers would also be unemployed and their $8 billion in taxes would no longer be collected. The support of servicing industries (equipment, fertilizer, seed, chemical sales and industry) are directly affected by conditions affecting agriculture.

A strong, healthy agriculture is not only in the interest of farmers; it is or should be in the interest of every person who likes three square meals a day. A healthy agriculture is everybody's concern and to label it a single interest group is rationale gone astray.

In summary, agriculture depends upon timely, accurate, detailed weather information that can only be provided by NOAA and the National Weather Service. To say that private industry can assume these services immediately is ludicurous. The cost factor to start from the ground up and reach the capabilities and provide services now assumed by Ruskin and others would be staggering to the newcomer and the fee that would have to be charged the farmer for this service would be prohibitive.

The Agricultural Weather Service is one of the few federal government services that truly works. The benefit versus cost ratio is heavily weighted in favor of benefits.

Rarely does so small an investment in funding and personnel carry so large a responsibility. The need in accurate weather information is escalating and not waning. The $1 million savings recognized by the Commerce Department by eliminating the agricultural weather station could be lost by Florida vegetable producers alone in one night due to unexpected freeze warning or miscalculation of time duration of minimum temperatures. The early frost warning program costs approximately $209,000 for servicing the four states which currently utilize this service. Again looking at the millions of dollars in Florida alone that can be riding on timely weather information, these dollars spent are a small price to pay.

It seems a little ironic to go to such lengths as the agricultural industry has in order to hopefully save a program that nationwide only cost $1 million; a program that has saved the federal government literally hundreds of millions in tax revenue by keeping farmers in business, farm employees employed, and consumers fed with safe, wholesome, cheap food. It seems particularly ironic when you learn of abuses such as those given the "Golden Fleece" award by Senator Proxmire and I'm sure those are only tips of the iceburg.

Agricultural weather forecasting is a service that pays for itself many times over in terms of benefits to the farmer.

We sincerely request you do everything possible to restore funding for this much needed service. We would like this statement to be entered into the record.

Sincerely,

DENNIS E. EMERSON,
Assistant to the President.

THE SECRETARY OF COMMERCE,
Washington, D.C., April 23, 1982.

Hon. HARRISON H. SCHMITT,
U.S. Senate, Washington, D.C.

DEAR JACK: Thank you for your letter concerning space activities in the Department of Commerce for fiscal year 1983. I am pleased to provide for the record a brief report on these activities.

As you requested, the enclosed statement contains an overview of the National Oceanic and Atmospheric Administration's (NOAA) space activities for fiscal year 1983. Particular references are included for those activities conducted with support or cooperation from the National Aeronautics and Space Administration (NASA). Also included in this report is information on NOAA's Upper Atmosphere Research Program and, in particular, activities relating to ozone monitoring.

I would like to draw your Subcommittee's attention to a fact which is not obvious from the budget submissions of NOAA and NASA for fiscal year 1983. NASA has decided to reduce its budget support for the Operational Satellite Improvement Program to near zero in fiscal year 1984 and to zero in subsequent years. The effect of the decision will be that NOAA, as part of its 1984 budget, will need to assess NASA's past work in the development of new satellites and advanced meteorological sensors to determine what efforts need to be continued and if additional resources are required by NOAA.

Sincerely,

MALCOLM BALDRIGE,
Secretary of Commerce.

Enclosure.

REPORT OF MALCOLM BALDRIGE, SECRETARY, THE DEPARTMENT OF COMMERCE

REPORT ON DEPARTMENT OF COMMERCE FISCAL YEAR 1983 SPACE ACTIVITIES

This statement summarizes the current status of, and fiscal year 1983 plans and budget for, space activities of the National Oceanic and Atmospheric Administration (NOAA). Additional information will be found in the Aeronautics and Space Report of the President for 1981.

NATIONAL EARTH SATELLITE SERVICE (NESS) PROGRAM HIGHLIGHTS

NOAA 6 and NOAA 7 are the current operational polar-orbiting satellites. NOAA 7 was successfully launched June 23, 1981.

The Argos Data Collection and Platform Location system, carried on the NOAA polar-orbiting satellites, is an economical means of collecting ocean current and ice data from remote-measuring platforms. These data are being used to support climate research programs.

A new technique which improves the accuracy of sea surface temperatures from polar satellite data was implemented November 17, 1981.

Polar-orbiting satellite data are being used to detect forest fires, volcanic eruptions, and the torching of waste gases from oil wells and steel plants.

Satellite sea surface temperatures are being used by commercial fishermen and marine shippers. The fishermen save fuel and time by using these data to locate preferred fishing areas, and shipping companies report fuel savings of up to $8,000 per day per ship by routing ships to use or avoid ocean currents located by satellite images.

Satellite derived snow maps were used by U.S. Government agencies to determine water resources and hydroelectrical power potential in many regions of the United States.

NESS continued to support AgRISTARS, a research program among five Federal agencies that uses data from NOAA and NASA satellites to develop a system for predicting commodity (crop) production in important agricultural areas of the world and for the detection and early warning of destructive environmental situations.

Foreign governments provide two instruments to the NOAA polar-orbiting satellites. France contributes the Argos Data Collection and Platform Location system, and the United Kingdom provides the Stratospheric Sounding Unit.

Over 120 countries continuously receive direct readout data (APT) from NOAA polar-orbiting satellites. Medium resolution satellite data are received at about 900 ground receiving stations, and high resolution satellite data (HRPT) are received in 25 countries.

Satellite data are being used to make ice observations in the Arctic regions. These data support commercial shipping, Coast Guard ice breaker operations, and Fish and Wildlife Service studies of marine mammal migration.

GOES 4 and GOES 5 are the current operational geostationary satellites. GOES 5 was suucessfully launched May 22, 1981.

Data from the European geostationary satellite, METEOSAT, are now relayed through NOAA for nationwide distribution to operational weather forecasters.

GOES-Taps, which are used to disseminate GOES satellite images to government, military, and private users, now number over 400.

There are 150 national and international users of the Weather Facsimile (WEFAX) system, which transimts both conventional weather and satellite data via GOES.

The GOES Data Collection System is used to relay data from more than 2,500 earth sites, a 100-percent increase in the past year.

The VISSR Atmospheric Sounder (VAS), carried on the GOES 4 and 5 satellites, is being used on an experimental basis to provide atmospheric moisture and temperature data and images of the earth in up to three additional infrared bands for weather forecasting and warnings.

NESS provides satellite data to the NWS Hurricane Centers on both the east and west coast of the United States. Using these data, hurricanes can be located with an accuracy of 20 miles and maximum winds estimated within 10 knots.

NESS will soon improve its operational support to the NWS Flash Flood Program by using an Interactive Flash Flood Analyzer to determine precipitation amounts from GOES satellite data.

NESS continues with its plans to take over the operational responsibility of Landsat in early 1983.

NESS continues with its plans for the proposed commercialization of land remote sensing.

A Program Board was formed for coordinating Federal Landsat matters and a Satellite Advisory Committee was formed for coordinating activities for private-sector takeover of land remote sensing.

NESS opened its seventh Satellite Field Services Station (SFSS) at Slidell, La. on August 24, 1981. Colocated with the NWS Forecast Office, it provides satellite weather support to forecasting and warning services in the offshore areas from Florida to Mexico.

NOAA and NASA demonstrated a Centralized Storm Information System (CSIS) at the Kansas City National Severe Storm Forecast Center. The CSIS is designed to improve weather analysis techniques using integrated satellite and conventional weather data.

Data from NASA's Nimbus 7 Coastal Zone Color Scanner continue to be used to monitor the ocean's biological productivity and pollution in the oceans, rivers, and estuaries. NESS hopes to be able to provide an operational continuation of these data by adding an instrument to the current NOAA polar-orbiters in the late 1980's.

AREAS OF DIRECT INVOLVEMENT WITH NASA

National Earth Satellite Service (NESS)

The Nation's operational environmental satellite service is operated by NOAA's National Earth Satellite Service (NESS). Management of the System is based on close cooperation between NOAA and NASA. The relationship between the two agencies is guided by a document entitled "Basic Agreement between U.S. Department of Commerce and the National Aeronautics and Space Administration Concerning Operational Environmental Satellite Systems of the Department of Commerce." The agreement specifically recognizes the Department of Commerce's responsibility to establish, operate, and obtain funds for the system; and the NASA responsibility to develop new and advanced technology, to develop operational prototype spacecraft to support the system, and to obtain funds for the NASA program. The agreement is reviewed periodically and amended, when necessary, to assure that it is current and relevant. The most recent version of the "Basic Agreement" was signed July 2, 1973. However, NASA is phasing out its Operational Satellite Improvement Program (OSIP) by the end of fiscal year 1984, and NOAA will start to include the OSIP activities in its fiscal year 1984 budget request.

The objective of NOAA's meteorological satellite program is to provide continuous observations of environmental conditions of the earth's surface, oceans, atmosphere, and near space. Since 1960, data from the experimental and operational environmental satellites have contributed significantly to the nation's environmental monitoring, prediction, and warning services. Similarly, the objective of the Landsat program is to monitor the earth's surface through remote sensing in order to obtain data for locating, developing, and managing natural resurces, both renewable and non-renewable. Landsat soon will be moving into an operational phase and will prove to be a valuable source of information for both the private sector and governmental communities.

Improvement and refinement and in satellite spacecraft, sensors, and ground data processing are proceeding with advances in space technology. Efforts of NOAA, in cooperation with NASA, to improve the effective performance of the operational satellite system, are directed in large part toward meeting national requirements as well as those established for the Global Observation System of the World Weather Watch (WWW) and the Global Atmospheric Research Program (GARP). The WWW and GARP programs are sponsored by the World Meteorological Organization. A broad program of cooperative technology development and research generates the new observation techniques, instrumental concepts, and sophisticated analysis techniques upon which improved operational capabilities will be based.

Polar Orbiting Satellites. The NOAA polar-orbiting satellites collect global observations in support of numerical weather analysis and prediction, flood forecasting, water resource management, fishing, shipping and ocean monitoring services, crop production forecasting, and solar activity monitoring. At the beginning of 1981 TIROS-N and NOAA 6 were the active polar-orbiting satellites being operated by the National Earth Satellite Service (NESS). On February 27, 1981, TIROS-N became inoperative after 28 months in-orbit when its power supply failed causing complete loss of attitude control. NESS operated a one polar-orbiting satellite system until NOAA-C (renamed NOAA 7 after achieving a successful orbit) was launched on June 23, 1981. NOAA 6 and NOAA 7 operate in sun-synchronous orbits at an altitude of 810 and 850 kilometers and provide environmental observations of the entire earth four times each day. NOAA 6 crosses the equator southward at 0730 local time and NOAA 7 crosses the equator northward at 1430 local time.

Geostationary Satellites.—The current GOES satellites, GOES 4 and 5, were launched on September 9, 1980 and May 22, 1981, respectively, and are located 37,000 kilometers above the equator at 75° and 135° West longitude. These satellites comprise part of a global network of geostationary meteorological satellites. Other nations and international organizations with existing and planned geostationary satellites are Japan (GMS currently in operation), India (planned launch in May 1982), the European Space Agency (METEOSAT currently in operation), and the

Soviet Union (definitive plans unknown). With the fiscal year 1983 budget, sensor procurement and construction of GOES–F and GOES–G will continue. Launch of GOES–F is planned for the early part of 1983, but actual launch will take place only in the event of a failure of GOES 4 or 5.

The principle sensor on the GOES satellites is the Visible Infrared Spin-Scan Radiometer (VISSR) Atmospheric Sounder, called VAS. VAS provides the first measurements of atmospheric temperature and moisture from a geostationary satellite and can be commanded to scan parts of the Earth at three to fifteen minute intervals in order to monitor the development of tornadoes or other severe storms. Sufficient VAS data have been obtained to demonstrate their potential for improving the North American weather forecast models over the eastern Pacific; diagnosing moisture patterns and circulations not otherwise evident in other upper air data; enhancing diagnoses of frontal and squall line structure; and improving height assignments to cloud-motion winds. In addition to the VAS, GOES also carry a Data Collection System (DCS) for the collection of environmental data from remote observing platforms, a Space Environment Monitor which provides solar radiation data to NOAA's Space Environment Laboratory, and Weather Facsimile (WEFAX) service which broadcasts conventional and satellite weather charts to national and international users.

The GOES-Tap system, which became operational in 1975 to disseminate weather satellite images by geographic sectors over standard telephone circuits, continues to expand. Due to increased expansion, NESS initiated hardware modifications that will allow for over 400 direct GOES-Tap connections through the Sattellite Field Services Stations (SFSS). The original 50 Weather Service Forecast Office-Taps have increased to over 200 taps to a multitude of users, including the National Weather Service, military facilities, private meteorological firms, television stations, and universities. Secondary taps off these 200 now total more than 400.

The GOES Weather Facsimile (WEFAX) broadcast schedules have been expanded on both the central and the west GOES so that 198 satellite sectors and 66 weather charts can be broadcast each day. There are about 150 national and international WEFAX users including more than 40 U.S. Government stations. During April 1981 the first WEFAX Users Conference was held in Washington, D.C. There were 130 attendees, including representatives from several foreign meteorological agencies, academia, industry, and amateur radio enthusiasts.

The GOES Data Collection System (DCS) now has more than 2500 Data Collection Platforms (a 100-percent increase in the past year) operated by 58 national and international users. There are now 13 operational direct readout stations with two more expected to become operational next year. A revised DCS Users Interface Manual was prepared and distributed. This revised document reflects the major changes that were implemented with the Automatic Monitoring System that keeps watch on the quality of radio performance of the DCS platforms. Also a major reply channel realignment has been initiated that will insure a 3-kilohertz separation between channels on the same spacecraft, thereby reducing the chances of interference and allocating certain segments of the frequency band for specific types of operations, such as random reporting and interrogation. Improvements in the data distribution from the NESS DCS Center at Camp Springs also include the addition of a rotary direct dial-in system.

On August 24, 1981, NOAA formally opened its seventh Satellite Field Services Station (SFSS) at Slidell, LA, to service the Gulf Coast and the Gulf of Mexico. The SFSS, colocated with the National Weather Service Forest Office, is staffed by a team of six meteorologists and one oceanographer. Slidell's mission is to assists the NWS in expanding weather and marine forecasting and warning services for coastal and offshore areas from Mexico to Florida. The SFSS will provide Gulf Coast weather stations with analyses and interpretations of satellite images and data on weather and marine events occurring tin the Gulf. Special attention will be paid to conditions affecting small craft and helicopter traffic supporting offshore oil platforms.

Land Satellites.—NOAA is on schedule to assume responsibility from NASA for operation of the new Landsat D system. Landsat D is the next generation land remote sensing satellite designed to satisfy continuing requirements for timely accurate, and reliable data on the earth's resources. The Landsat D system, with its new higher resolution Thematic Mapper (TM) sensor, will improve the ability of the United States to locate minerals, oil and gas, and other non-renewable resources; and to monitor and forecast global crop production; to manage its renewable resources; and to monitor floods, earthquakes, and other natural disasters.

Landsat D, which will carry the TM sensor in addition to the Multispectral Scanner (MSS), is scheduled for launch in July 1982. Landsat D will be completed in mid-1983 and launched in 1985, assuming that Landsat D lasts its predicted lifetime.

NOAA will assume responsibility for operating the spacecraft and producing Landsat tapes and images as soon as acceptable performance criteria are met for Landsat D, which is expected to be by January 31, 1983. NOAA will assume responsibility for managing the TM activity by January 1985, after NASA has completed a 2-year R&D effort. the TM will provide better spectral coverage of the earth than the planned foreign competition.

NOAA has taken the following specific steps to assure a smooth transition of operating responsibility from NASA to NOAA:

Created a Landsat operations group in NOAA; staffing of this group is now 60 percent complete, and it will be fully staffed 6 months before takeover.

Issued a request for proposals for a contractor to manage the spacecraft command and control and data preprocessing functions at the Goddard Space Flight Center.

Reached agreement with the EROS Data Center on NOAA's management of the data processing, delivery, and billing functions at the EROS Data Center.

Negotiated with NASA the detailed terms for turning over the spacecraft and ground system to NOAA, including eventual responsibility for TM data, and for continued NASA assistance after the transition.

With NOAA's takeover of Landsat operations, the U.S. will have for the first time a single manager of the Landsat program—from spacecraft command and control to data production and dissemination. NOAA will have on-site managers at the EROS Data Center. For the first time NOAA will offer to customers a system of ordering special acquisitions of data for the desired time and place on the earth. This system will allow customers with specific requirements to obtain satellite coverage over their particular area of interest. The Landsat D system is designed to provide preprocessed data to realtime users, such as the Department of Agriculture, within 48 hours. It is anticipated that products from the EROS Data Center will be delivered to buyers on a more routine basis than from the current experimental system. To match these new and improved services, NOAA has announced a new price list for Landsat products effective October 1, 1982.

NOAA also has advised the eleven foreign ground stations now receiving Landsat data directly that the annual fixed access fees will be increased and that they will have to pay distribution fees based on the type and number of products distributed by station operators. These increases are necessary if NOAA is to achieve its goal of offsetting the requested Federal appropriation. The DOC is in the process of negotiating new agreements with these stations to reflect the new prices.

To advise NOAA in planning for operational takeover and commercialization of Landsat, the Secretary of Commerce created a 15-member non-Federal Land Remote Sensing Satellite Advisory Committee and is in the process of making final selections for the Committee from the more than 160 nominations received to date. The Advisory Committee is expected to meet in April 1982 and meetings will be open to the public.

NATIONAL WEATHER SERVICE (NWS)

Presently, NWS provides reimbursable meteorological support to NASA space programs in two areas. This support includes weather forecasts, briefings, special studies, and consultant studies. At the Johnson Space Center the burgeoning Shuttle flight test program has increased the real-time forecasting burden. Between such missions, simulations and studies continue as procedures are polished and new mission experiments are devised. Six launches are planned for fiscal year 1983.

The National Weather Service support to the 1981 space shuttle flights was aided by GOES satellite images. The satellite data were particularly useful in monitoring weather conditions near preselected recovery sites around the world. The weather criteria for recovery or landing sites are very stringent, and the high resolution images provided information not available from other observation sources.

In 1980 NASA and NOAA demonstrated a Centralized Storm Information System (CSIS) in the operational environment of the National Severe Storms Forecast Center (NSFFC) in Kansas City. During 1981 the Kansas City SFSS and the National Severe Storms Forecast Center completed a preliminary evaluation of the CSIS. The CSIS is designed to improve analysis techniques by providing increased flexibility in displaying satellite data and superimposing conventional meterorological information on the satellite images. This new technology provided field forecasters with improved mesoscale analyses and guidance. Satellite Interpretation Messages discussed phenomena such as rapidly developing thunderstorms, intersecting small-scale boundaries where convection often develops, and low-level wind shear boundaries. In addition, greater emphasis was placed on weather situations that adversely affect aircraft operations such as identifying areas where fog and stratus are form-ing, moving, and dissipating and areas of adverse winds aloft. This rapidly transmitted information allowed air controllers to assess pending air-traffic problems better and improve terminal forecasts.

In the area of stratospheric ozone monitoring, NWS is continuing a program of synoptic and statistical analyses and preparation of standardized products and services derived from satellite and groundbased ozone and meteorological observing systems; developing a baseline data set for 1970–1984 from ozone data acquired by NASA R&D satellites; comparing monitoring systems based on different physical principles; overall verification of the NOAA satellite and groundbased ozone monitoring systems; and analyzing climatic effects of observed ozone trend changes.

ENVIRONMENTAL DATA AND INFORMATION SERVICE (EDIS)

EDIS acquires, processes, archives, analyzes, and disseminates worldwide environmental (atmospheric, marine, solar, and solid Earth) data and information for use by commerce, industry, the scientific and engineering communities, the general public, and Federal, State, and local governments. It also assesses the impact of environmental fluctuations on food production, energy production and consumption, environmental quality, and other economic systems. To carry out its mission, EDIS operates a network of specialized service centers. EDIS provides data collected by NOAA's environmental satellites and NASA experimental satellites.

As part of this mission, the Satellite Data Service Division of The National Climatic Center—an arm of the Environmental Data and Information Service—archives U.S. environmental satellite data and information and provides them to retrospective users. This archive is a unique source of data and information. It contains observational material (film images and magnetic tapes) collected by numerous environmental satellites beginning in early 1960. In addition to meteorologically oriented data, the archive also contains data and information that are of interest to oceanographers, agronomists, geologists, hydrologists, and climatologists. These data are especially valuable to those engaged in research or monitoring conditions over areas for which no other type of observational data are available. Orders from users of these data are increasing an average of about 15 percent each year, and the size and complexity of the orders are increasing even more.

The National Climatic Center provides special climatological support required by the various NASA Centers. The tasks include:

Archive and publish meteorological rocket observations of wind, temperature, and density for altitudes 20 to 90 km obtained from a 30-station worldwide network. These data are used to determine the wind and thermodynamic stresses experienced by spacecraft, including the Space Shuttle, during launch and reentry.

Extract and digitize hourly peak wind data for Cape Kennedy Air Force Station. Digitize and quality control hourly surface weather observations for Cape Kennedy AFS and Fandenburg AFB. Data are used to support space vehicle launches.

Provide serially complete observations of wind speed and direction at 1-km intervals from the surface to 30 km for Vandenberg AFB for modeling environmental conditions expected during Shuttle recovery.

Process Air Force global 3-D nephanlysis cloud data for NASA to be used in support of space shuttle operations.

EDIS has developed a computer program to identify the equatorward boundary of the auroral oval using energetic particle data from the TIROS-N and NOAA 6 satellites. The results are to be used to support the testing of a new U.S. Air Force "over the horizon" radar system which (when affected by ionospheric conductivity) contrasts and changes along the radar's viewpath.

EDIS completed feasibility and design studies and functional specifications and started the procurement process for a system to collect full resolution GOES digital data and store it on appropriate mass storage media, produce statistical summaries as these data are being ingested, and provide photographic and digital data or summary products. EDIS awarded a contract for the production of this system during the latter part of 1981 and plans to implement it in late 1982 or early 1983. Meanwhile, the University of Wisconsin is archiving these data for the period beginning with the First GARP Global Experiment (December 1978) until the new system is implemented.

EDIS completed a functional design for an Electronic Catalog Service system. Implementation of the basic system is planned in late 1982. This system will provide satellite data to elements of the U.S. Climate Program through development of a comprehensive catalog of satellite data and products. A computerized interactive system with remote access (supplemented by hard copy) will provide "one-step" service for information about satellite data and products. This catalog will contain information about the availability, characteristics, and source of data and products from all satellite data archives. Ultimately the user will be able to place an order electronically.

ENVIRONMENTAL RESEARCH LABORATORIES (ERL)

ERL extended a hardware feasibility study of a Space Shuttle-borne Windsat, a satellite capable of measuring global winds by means of an onboard pulsed Doppler lidar (laser light detection and ranging), so that experiments involving the detection of water vapor, temperature, aerosols, and atmospheric species could be used. With only minor changes, the Windsat feasibility experiment was modified to accommodate a number of experiments originally proposed for other lasers. An analysis of the preliminary design of Windsat, wherein the weight and power were traded off against pulse repetition rate, showed that Windsat could perform with a satellite weight of less than 1,000 kilograms and power less than one kilowatt.

NOAA's National Hurrican Research Laboratory (NHRL) continued to use satellite and other remote sensing data to support its hurricane research. Aircraft-borne microwave instruments were used to measure wind speeds in Hurricane Greta (1978) and Hurricane Ella (1978) and were compared with Seasat scatterometer-derived winds. Seasat-derived winds were within 10 percent of the aircraft-measured winds over most of these storms. The exception was near the region of maximum winds where Seasat underestimated aircraft-measured winds by 20 percent because of poor spatial resolution. In another similar experiment conducted in Hurricane Allen (1980), satellite-derived winds were within 10 percent of the aircraft-measured winds up to 240 kilometers per hour and were of high spatial resolution. The results of this experiment demonstrate that hurricane-force winds can be remotely measured.

At the Jet Propulsion Laboratory, data from the 100 days of Seasat observations in 1978 were processed to provide the first global maps of mean wind speed and wave height measured from satellites. Over 3.5 million observations were averaged into 2.5° latitude by 7.5° longitude areas. These maps demonstrate the potential for satellites to provide synoptic-scale, global sea state information useful to oceanographers, meterorologists, and climatologists.

Results of global measurement of atmospheric water vapor by the Seasat Scanning Multichannel Microwave Radiometer (SMMR) also were shown. These water vapor estimates were used to make pathlength and attenuation corrections to the active microwave radiometers: the Altimeter, from which estimates of windspeed and significant wave height at nadir were obtained; and the Scatterometer, which gave estimates of the vector wind field near the surface. Global estimates of water vapor would be useful in their own right in climatological studies of the temporal variability of the latent heat of vaporization that is transferred from ocean to the atmosphere.

The sea surface temperature data, derived from the Seasat SMMR, were compared with conventional data observed at the surface. In the tropical Pacific Ocean, the SMMR-derived temperatures were inferior in absolute accuracy, comparable in relative accuracy, and superior in uniformity of spatial coverage to the ship injection temperatures. With improved computer programs the SMMR temperatures are potentially better than those from ships.

NOAA's Office of Weather Research and Modification (OWRM) uses GOES digital infrared satellite images in its research to estimate rainfall from convective clouds. Rainfall was estimated over the central United States for one month. The technique was tested under mesoscale conditions for the purpose of developing stream-flow models. The satellite rain estimates compared favorably with rain gage and radar data.

OWRM, in collaboration with NASA and NOAA, investigated the Florida sea breeze regime. Rainfall was computed for six study days, and the rainfall patterns of the convergence zones shown in a sea-breeze model were similar to rainfall estimates from the satellite data.

The Space Environment Services Center (SESC), operated by NOAA and the U.S. Air Force, is the National and World Warning Agency for disturbances on the sun, in interplanetary space, in the upper atmosphere, and in the earth's magnetic field. A major portion of the realtime data comes from space environment monitors on NOAA's polar-orbiting and geostationary environmental satellites.

A significant improvement in short term warning capability was instituted using new data supplied from NASA's third International Sun Earth Explorer (ISEE) satellite. The technique allows an accurate 25 to 50 minute advance warning of the beginning of geomagnetic storms. Warnings of radiation hazards from solar activity for the Shuttle began with its first flight in April 1981.

A measure of the total energy deposited by ionized particles precipitating downward into the earth's atmosphere in the auroral regions is made by the NOAA polar-orbiting satellites. Processing routines were completed sufficiently to allow the first extensive access to the data and to make it available for realtime use in the SESC. A new computer system is being procured that will assemble, store, display, and distribute these space environmental data.

NOAA's Space Environmental Laboratory developed technically and scientifically sophisticated data presentation techniques for display of data from experiments aboard the ISEE satellites. These techniques have been applied to the complete ISEE 1 data set, and processing of ISEE 2 data is underway. Such complex data presentation techniques are crucial to the effective analysis of data from large data bases and correlative data from other sources. Analysis of observed characteristics of energetic particles in the geomagnetic tail allowed Laboratory scientists to model a physically self-consistent mechanism for acceleration of charged particles in the geomagnetic tail and their deposition in the earth's auroral regions. This mechanism represents a significant source for energization of the magnetospheric particle populations.

NATIONAL OCEAN SURVEY (NOS)

The National Geodetic Survey, the component of the National Ocean Survey (NOS) that is responsible for maintaining a national network of precisely-positioned ground stations for geodetic surveying, mapping, and a variety of scientific and engineering applications, continued to work closely with NASA to apply space technology to geodesy and geodynamics. The development of a new generation polar motion and universal time monitoring network continued. The network will consist of three radio astronomy observatories, equipped with the most advanced Very Long Baseline Interferometry (VIBI) data acquisition instrumentation, and a special data reduction and analysis center. Two stations of the network are now operational. They are located in Fort Davis, Texas, and Westford, Massachusetts, and observations are being made on a weekly basis. Detailed comparisons with satellite laser-ranging determinations indicate that the network is achieving its design goal of 10-centimeter accuracy in pole position determination. This level of accuracy was achieved with observing times of 24 hours or less. Other techniques (satellite laser, satellite Doppler, and optical techniques) require days to weeks of observing to achieve comparable accuracy.

NOS is participating in the development of Global Positioning System (GPS) geodetic receivers with the goal of deploying prototype systems by the end of 1983 and improving operational productivity by a factor of 20. This is part of a formal agreement with NASA, the U.S. Geological Survey, and the Defense Mapping Agency to establish a coordinated approach in the development of these receivers.

NASA and the National Geodetic Survey established the Crustal Dynamics Project to apply space methods and technology to advance the scientific understanding of Earth dynamics. This project is an integral part of the geodynamics program for the application of space technology to crustal dynamics and earthquake research. The project supports the United States' national program in earthquake hazard reduction by studying dynamic processes related to earthquakes and support ongoing national and international research programs in global geodynamics.

NATIONAL MARINE FISHERIES SERVICE (NMFS)

The National Marine Fisheries Service continued to use the Remote Access Measurement System on Nimbus 6 in tracking studies of adult loggerhead turtles. These experiments were terminated prematurely in September 1981 because the tape recorder system on the spacecraft failed. Only one significant problem was found in using satellites to track sea turtles, and that was in the visual orange paint used on the transmitters. In one documented instance a fisherman, seeing the brightly painted transmitter, chased and caught the tagged turtle, removed the transmitter, and released the turtle. A dull gray paint is now being used. Success of these experiments has prompted redesign of the transmitters for use with the NOAA Argos tracking system. Two prototype systems will be field tested in 1982. These systems are about one-fourth the size of the Nimbus 6 transmitters and will operate for one year.

The first NMFS satellite data processing and analysis system was installed at its Bay St. Louis, Mississippi facility of the Southeast Fisheries Center through a cooperative effort with NASA. Software, originally designed for Landsat data, was updated to process Nimbus 7 Coastal Zone Color Scanner, GOES, and NOAA temperature data. The system already has been used in a fisheries study by the University of Michigan and will be used in cooperative studies with the Northeast and Southwest Fisheries Centers, the state of Louisiana, U.S. Fish and Wildlife Service, and NASA.

A study was initiated to develop ways to establish relationships between the areal extent and character of coastal wetland ecosystems and the health and productivity of recreationally and commercially valuable living marine resources. The study is being conducted cooperatively between the Northeast and Southeast Fisheries Centers and with NASA and the state of Louisiana. The study will concentrate on marsh areas in Louisiana, using Landsat data to monitor changes in wetland ecosystems.

Operational products were developed using Seasat wind data as input to a Gulf of Mexico surface transport model. Examples of these products are the inventory of available data, the display of wind vectors, and the derivation of wind-induced properties of ocean circulation in the Gulf. Model products such as wind-driven currents and transport and upwelling areas provide special capabilities for fisheries applications particularly in the dispersal mechanisms for planktonic organisms. Ocean current data are used to show trajectories and establish time requirements for passive life stages to drift from one location to another. Seasat provided new technology for fisheries applications to monitor, model, and predict pathways by which offshore spawn of estuarine dependent shellfish and finfish find their way into coastal nursery grounds.

An objective of NMFS is to achieve a zero net loss of habitat and productivity for critical living marine estuaries and anadromous species by 1985. Using Landsat data the Northeast Fisheries Center (NEFC) developed the plan and implemented the Coastal Habitat Assessment and Research program to quantify changes in productivity, biomass, and areas of principal coastal zone habitat types from North Carolina to Maine. The program will proceed in three phases: Phase 1 will determine how many acres of wetlands exist and what vegetation types they contain; Phase 2 will determine how many acres of wetlands have been lost or gained in the past ten years; and Phase 3 will determine how the value and quality of coastal habitat is changing based on biomass and other properties.

NEFC also participated with the NASA Langley Research Center in the Nantucket Shoals Experiment and the planning of the National Science Foundation warm core ring studies. The objective of the Nantucket Shoals Experiment was to use shipboard, in situ, and aircraft and satellite remote sensing techniques to investigate the distribution and abundance of phytoplankton on the shoals in relation to rates of nutrient supply, growth, vertical mixing, and advective processes. The objective of the warm core ring studies is to enhance the understanding of physical, chemical, and biological processes related to Gulf Stream warm core rings. NEFC is augmenting this experiment by studying the shelf-slope interface. To support these activities NEFC is building a High Resolution Picture Transmission system in cooperation with NASA Goddard.

The Northeast Area Remote Sensing System (NEARSS), a new regional capability to receive and use remotely sensed data, consists of five elements. These are: receiving system, processing system, a data retrieval service, a regional communications net, and user services. The development of NEARSS is guided by an association of users whose charter members are university and government agencies. NEARSS is presently in the development stage.

The application of satellite observations in marine fisheries research and management is being evaluated in studies at the Southwest Fisheries Center (SWFC). Using satellite thermal infrared images and extensive sampling for northern anchovy eggs and adults, it was found that no spawning occurred over large areas of the coastal ocean off California during the peak spawning period.

In this study only satellite data provided fishery scientists with a synoptic picture of the large scale oceanographic events happening over the entire anchovy area during the peak of the spawning season. Other studies indicate that oceanic boundaries, which are important in determining the distribution and migration patterns of albacore tuna, can be detected and monitored using satellite thermal infrared and ocean color images.

COOPERATION IN INTERNATIONAL ACTIVITIES

Two foreign governments contribute instruments to the NOAA polar-orbiting satellites. The French National Center for Space Studies provides the Argos satellite data collection system; the British Meteorological Office provides the Stratospheric

Sounding Unit, a component of the TIROS Operational Vertical Sounder. There are 14 countries operating 275 platforms through the Argos system. Since the majority of the platforms are expendable, they must be periodically replaced, and more than 2,000 platforms have been used since its inauguration. Currently, the U.S. funded Processing Agreement supports 145 platform-years. The telephone communications system at Suitland, Maryland, which allows users direct access to their disc files in Toulouse, France, is being used by 27 subscribers.

More than 120 countries receive images and digital data directly from satellites operated by NOAA. Local governments, academic and scientific institutions, commercial companies, and radio amateurs have bought or built stations to copy these direct readout transmissions. Medium-resolution images from NOAA spacecraft are received in some 890 locations globally; high resolution data are obtained in 25 countries. Geostationary satellites provide weather facsimile broadcasts to nearly 30 countries in the Western Hemisphere and to Australia and New Zealand; three nations outside the United States also receive high-resolution images. The GOES Data Collection System also is used by several countries in the Western Hemisphere for relay of environmental data from remotely located platforms.

Applications of these data overseas are primarily for storm detection and aviation forecasting. Special-interest groups also receive and use the data for hydrology (river and flood forecasting, snow accumulation and melt), oceanography (sea ice monitoring, ship routing, pelagic fish migration and harvesting), and other activities. Academic and scientific institutions obtain direct readout transmissions for research.

NOAA participates in an informal, technical group known as the Coordination on Geostationary Meteorological Satellites (CGMS) through which the technical managers of agencies pursuing plans for national geostationary meteorological satellites discuss common interests relating to the design, operation, and use of their spacecraft. The European Space Agency (ESA), Japan, the Soviet Union, and India also participate. As a result of CGMS, there are four operating geostationary meteorological satellites—two launched by the U.S. and one each by ESA and Japan. While independently designed and developed, they have met common meteorological mission objectives and have produced certain compatible data products for worldwide users.

The current and prospective operators of national land remote sensing satellite systems have established a similar informal technical group known as Coordination of Land Observation Satellites. This group, in which NOAA and NASA participate for the United States along with representatives from France and Japan, is considering prospects for coordination and harmonization of data products, satellite-to-ground telemetry, and spacecraft orbits to ensure maximum compatibility among national land-observing satellite systems. During 1981 NOAA also coordinated U.S. participation in a series of regional meetings in Africa, Asia, and South America to inform prospective users of the planned national land remote sensing satellite systems.

Images from the European weather satellite, METEOSAT, were first received by NOAA September 16, 1981, and became an operational product available to GOES-Tap users during October 1981. These images, consisting of visible, thermal infrared, and atmospheric water vapor data, provide excellent weather information for aviation and shipping in the eastern Atlantic, Europe, Africa, western Asia, and the western Indian Ocean. These data are received at NASA's Goddard Space Flight Center and are relayed directly to NOAA where they are available for nationwide distribution.

EDIS used precipitation estimates from NOAA and GOES satellite images to support directly the Department of State's Agency for International Development disaster assistance effort. These data are used to evaluate the effects of weather on crops in developing nations. EDIS provides weather data support to 50 countries in Africa, to Central and South America, and to Asia. EDIS also provides central information exchange services and archival and data dissemination services for the international Solar Maxium Year program. It also provides preliminary information exchange services and participates in planning for the Middle Atmosphere Program schedule for 1982 to 1985.

NASA RESEARCH AND DEVELOPMENT SUPPORTING NOAA MISSION

In the area of operational environmental satellites, the planning and working relationships between NASA and NOAA are close and effective. Within the resources available, NASA structures its programs to develop technology which is responsive to the needs of NOAA. Under a reimbursable agreement, NASA procures the spacecraft, launch vehicles, and launch services needed to continue NOAA's operational environmental satellite program.

NOAA works closely with NASA to design and develop instruments for observing and measuring environmental phenomena from space platforms. Consultant services are provided to NASA during development of instruments for the operational environmental satellite program. NOAA has in the past, by agreement with NASA, designed and developed certain instruments. In such cases NOAA carried out the basic instrument design for eventual test in the NASA research and development satellite flight program. After acceptance by NASA of the NOAA design for a research spacecraft flight, NOAA developed and procured the flight hardware under reimbursable arrangement with NASA. A number of sensors have evolved from this program. Among these sensors are the Satellite Infrared Spectrometers (SIRS) flown on Nimbus 3 and 4, the Infrared Temperature Profile Radiometer (ITPR) flown on Nimbus 5, the Earth Radiation Budget (ERB) radiometer flown on Nimbus 6 and 7, and the High-Resolution Infrared Sounder (HIRS) flown on Nimbus 6 and current NOAA polar satellites. NASA programs with application to NOAA's needs include the following:

Polar Orbiting Satellites.—Development of the TIROS-N (NOAA) system of environmental polar-orbiting satellites was undertaken by NASA in response to requirements established by NOAA. On October 13, 1978, TIROS-N, the first prototype of this series, was launched. On June 27, 1979, NOAA 6, the first NOAA operational version of this series, was launched and on June 23, 1981, NOAA 7 was launched. TIROS-N no longer is operational. The system uses technology and hardware developed and tested in NASA's research and development programs, and to the extent feasible, makes maximum use of technology developed for military satellite programs. For example, the TIROS Operational Vertical Sounder (TOVS) was modified to include a NASA-developed High Resolution Infrared Sounder (HIRS 2), the Microwave Sounding Unit (MSU), and the Stratospheric Sounding Unit (SSU). The original version of the HIRS was flown on Nimbus 6. The 4.3 micrometer channel on the HIRS 2 provides more accurate data from which temperature and moisture profiles are derived. NASA will continue through fiscal year 1983 to implement improvements on the HIRS 2.

Nimbus.—NASA's Nimbus program was conceived as a meteorological satellite research bus to carry developmental space system. These systems were to be primarily concerned with providing data of importance to improving weather forecasting. To date, the program has provided for the evolution of atmospheric remote sensing instruments from the comparatively simple TV cameras to the sophisticated temperature sounding instruments now in operational use. The Nimbus program continues to make major contributions to NOAA's programs by testing and demonstrating new instrument technology.

Nimbus 7, launched October 24, 1978, is a multidisciplinary satellite with application to pollution monitoring, oceanography, and weather and climate. It carries the Coastal Zone Color Scanner (CZCS), and Earth Radiation Budget (ERB) instrument, a Solar Backscatter Ultraviolet (SBUV) instrument, and other instruments to measure the global distribution of aerosol and trace gases, including ozone, in the stratosphere.

The Coastal Zone Color Scanner, a NASA developed instrument, is the first space sensor designed specifically for measurements of ocean color. These ocean color measurements provide large-area maps of phytoplankton blooms, suspended particulates, and water masses and types. These data have application to NOAA interests in fisheries environmental assessment and prediction, coastal engineering, and environmental quality monitoring.

NESS processed data from the Coastal Zone Color Scanner on Nimbus 7 for use in developing computer programs for deriving phytoplankton pigment in areas in the northwest Atlantic Ocean where extensive biological and optical data were collected by ships. The agreement between the data obtained from the scanner and the optical and biological observations measured at the surface is excellent. Development of good atmospheric corrections for the scanner data has produced images showing detailed phytoplankton patterns associated with large-scale oceanic features such as currents and warm-core rings.

NOAA's Pacific Marine Environmental Laboratory also used scanner data to develop the refine programs from measuring particulate matter distributions from ocean surface color information. In particular, images over the North Pacific Ocean are being compared with shipboard measurements of chlorophyll and particle concentrations. The objective is to use satellite data to monitor ocean productivity and its effect on the carbon dioxide atmosphere-ocean exchange rate.

During 1982 NMFS will use ocean color and thermal data from the Nimbus 7 Coastal Zone Color Scanner to analyze ocean conditions. The scanner has the capability to detect chlorophyll concentration which, combined with temperature data, may provide more insight into the large scale distribution, abundance, and migration patterns of large oceanic pelagic fish such as bluefin tuna, billfish, and sharks.

In addition, ocean color images from the Nimbus 7 color scanner are being used to assist in the descriptions of the marine habitats for coastal marine mammals. The Southwest Fisheries Center (SWFC) also is participating in an experimental, satellite-oriented, observation program for commercial fisheries sponsored by the Jet Propulsion Laboratory and the Ocean Services Division of the National Weather Service. SWFC is serving as liaison with fishermen, participating in the evaluation of the program and is providing color scanner images for inclusion in the products.

The most reliable measurements of incoming solar radiation and reflected and radiated energy from the earth-atmosphere system are obtained from outside the atmosphere. Long-term variations in the earth's radiation budget is the driving force for climate control. Both natural and man-made changes affect the radiation balance. These changes may ultimately have considerable impact on food production, energy use, and water resources. Measurements of solar radiation have been obtained from NASA research satellites on an intermittent basis. NOAA developed the Earth Radiation budget Instrument successfully flown on NASA's Nimbus 6 and 7. The introduction of this capability into the operational system in order to provide continuous long-term monitoring for climate studies will be done in close collaboration with NASA in conjunction with their Earth Radiation Budget program. The Earth Radiation Budget Experiment will be carried on two NOAA system satellites starting with NOAA-F. Data from the Nimbus 7 Earth Radiation Budget Instrument are improving the accuracy of determining radiative heat gains or losses of the Earth. This accuracy results from improved instrument design and from advanced models of bidirectional reflective and emission of radiation from earth and cloud surfaces. The models are critical in the interpretation of satellite measurements and will be used in the future operational radiation budget programs.

NESS scientists have made considerable progress with their research in the Nimbus 7 Earth Radiation Budget program. Two complete years of solar data have yielded a mean solar constant of 1375.65 watts per square meter with a standard deviation of 0.97 watts per square meter. Variations exceeding 0.2 percent over 567 days were observed and independently verified by an instrument on the Solar Maximum Mission satellite. A preliminary set of models for the angular distribution of reflected and emitted radiation was produced and appears to be an improvement on existing models.

A 67-month data set comprising mean monthly radiation budget estimates (albedo, outgoing radiation, absorbed solar energy) is being extended with NOAA 6 and 7 data. These data have been extensively used by the Climate Analysis Center in their diagnosis of climatic conditions and by NESS to study the radiation balance during the First GARP Global Experiement.

There is an increased awareness of the impact of man on the stratosphere, particularly the possibliity of reduction of stratospheric ozone and subsequent effects on climate and health. The Committee on the Impact of Stratospheric Change of the National Academy of Science, the Federal Interagency Task Force on Inadvertent Modification of Stratosphere, and the Interdepartmental Committee for Atmospheric Sciences all recommended that long-term monitoring of atmospheric ozone be undertaken. This monitoring is needed so that trends can be established which, if they can be distinguished from natural variations, may be the first indication of man affecting the stratosphere. Since the stratospheric ozone layer shields the Earth from the full effects of the Sun's ultraviolet radiation, diminution of the layer could have subsequent deleterious effects on man and may lead to climatic changes.

A practical technique for monitoring global ozone was demonstrated by NASA's Solar Backscatter Ultraviolet (SBUV) instrument carried by Nimbus 7. The Nimbus 7 SBUV continues to provide ozone measurements, but NASA does not plan additional ozone measurements from its research satellites. However, NASA has prepared specifications to adapt the Nimbus-7 SBUV instrument for operational use on the NOAA series spacecraft beginning with NOAA-F.

Operational (Meteorological) Satellite Improvement Program (OSIP).—NASA is completing its support of NOAA through OSIP in fiscal year 1984. The VAS demonstration program, begun following the launch of GOES-D in September 1980 will be completed in fiscal year 1983 through support of activities at the University of Wisconsin, Goddard Space Flight Center, and Wallops Island, Va. NASA will continue its support for the development of the ozone-monitoring Solar backscatter Ultraviolet (SBUV) instrument to be flown on the NOAA F satellite. This instrument is being developed under the prior NOAA/NASA agreement which called for NASA to fund development and first prototype instrument and for NOAA to fund successive instruments. Fiscal year 1983 funds and a small amount in fiscal year 1984 will complete NASA's obligation for new space systems development on behalf of NOAA. Starting in fiscal year 1984, funding requests for development of new space systems will appear in the NOAA budget request. NASA will still continue development activities for NOAA on a reimbursable basis.

Land Remote Sensing.—In addition to its planning activities in connection with the transition to an operational Landsat program, NOAA continued its participation in the Agriculture and Resources Inventory Surveys Through Aerospace Remote Sensing (AgRISTARS) program. Information on global crop production is required for effective response to fluctuations in the world food supply. This information is useful to all sectors of the agricultural community including individual farm and ranch operators, commodity analysts, agribusiness, and agricultural policy makers.

AgRISTARS, an interagency research program started in 1979, is a comprehensive research effort to adapt remotely sensed data to Agricultural monitoring. The U.S. Department of Agriculture is responsible for making forecasts of crop production and crop quality. These forecasts are subject to error because of untimely and sparse conventional weather observations from many agriculturally important areas of the world. The NESS AgRISTARS program is developing products from operational environmental satellite data that will supplement conventional weather observations and improve the accuracy of Agriculture's forecasts. The agriculturally useful products being developed are estimates of precipitation, solar radiation, maximum/minimum temperatures, snowcover, and vegetative index. During 1981 computer programs were developed to estimate all these quantities from operational satellite data. Plans are to continue the development effort and to test already developed programs in an operational environment. Precipitation and solar radiation estimates were delivered to Agriculture on a test basis in 1981.

Since May 1981, NOAA polar orbiting satellites have been making infrared observations over crop regions designated by Agiculture's Crop Commodity Assessment Division. The satellite data are used to produce a number, called a "vegetative index" which is proportional to the health and vigor of the plant life. Coverage for these crop regions varies from one to nine days. An average of four sets of the infrared data are sent each morning to the Johnson Space Center for operational use. The NOAA 7 satellite, with its high sun-angle afternoon orbit, permits monitoring of high latitude crops year around. In cooperation with NASA, the Nile Delta crop region is being studied on a priority basis to develop scan angle and atmospheric attenuation corrections for the satellite data. The State Department Agency for International Development, the Central Intelligence Agency, and the United Nations Food and Agriculture Organization also use these data. Additional applications of these satellite data, aside from crop monitoring, are terrain classification, monitoring of deforestation, and the spreading of deserts.

Polar satellite infrared data also provides valuable information on the variation of soil temperatures in the Alaskan Interior during the summer. This information, provided to soil scientists of the Department of Agriculture, is particularly useful for land use planning for the emerging agricultural industry of Alaska.

EDIS acquired, tested, and evaluated candidate yield models for wheat, sorghum, corn, soy beans, rice, and cotton. Using advanced remote sensing data obtained from NOAA and NASA satellites and selected remote-sensing data from aircraft, AgRISTARS objectives are to develop an early warning system to detect conditions affecting crop production and quality and to provide techniques for more accurate forecasts of domestic and foreign commodity production in the major grain-producing countries of the world.

EDIS also developed techniques for using data acquired through the Advanced Very High Resolution Radiometer of NOAA 6 to complement LANDSAT multispectral scanner data. Initial results are very encouraging with respect to identifying areas of crop stress and also areas of flooding. The capability of the polar-orbiting meteorological satellites to cover the same area four times each day (twice if the current polar program is reduced to a single satellite), compared to once every 18 days for LANDSAT, is an advantage in identifying significant weather events impacting crop yields.

Satellite altimetry.—The Geodynamics Experimental Ocean Satellite (GEOS 3) altimetry data were used to determine the mesoscale variability of the seasurface height in the western north Atlantic Ocean in and around the Gulf Stream meander region. The results are in quantitative agreements with results obtained from conventional ocean-going research ships. This achievement demonstrates the potential of satellite data to supplement ship observations.

Six tidal constituents and the mean sea surface height were determined in the Atlantic Ocean Calibration area off the southeast coast of the United States using radar altimeter data from GEOS 3. Three lunar tidal constituents and the mean sea surface height were obtained for the same area using radar altimeter data from Seasat. Reasonably good agreement was shown between the Seasat and GEOS 3 determinations. Comparisons of the six tidal constituents, based on the altimeter data, with deep-sea tide guage measurements showed generally good agreement.

NOAA RESOURCES FOR SPACE PROGRAMS

National Earth Satellite Service

The following table outlines NOAA obligations including direct appropriations, to support the environmental satellite services program in fiscal years 1981-1983. The reimbursable support from NASA and other agencies is for the evaluation of data from NASA research and NOAA operational satellites and aircraft to support NASA and other agency missions, for design and development of new sensors to be tested aboard the space shuttle and other suitable research and operational satellites and aircraft, and for support of communication services at satellite Earth stations.

Obligations in fiscal year 1982 for environmental satellite services provide funds to continue procurement of GOES and TIROS-N system spacecraft and instruments, launch vehicles and services, ground equipment to control the satellites, to acquire and process observed data, and to continue the application of satellite data to improve environmental services. These data contribute to earlier detection of potential natural disasters with consequent reductions in economic and social impacts of such events. In addition, funds are provided for the technical, scientific, and management support necessary for a future operational land remote sensing satellite system.

Fiscal Year 1983 Budget Summary.—NOAA's fiscal year 1983 budget maintains these important programs at levels which will accomplish basic program objectives. The total fiscal year 1983 budget request for NESS is $151,498 million. This amount does not represent an enhancement to the current Earth Satellite Service budget; rather, it reflects a continuation of existing funding levels for the two in-orbit geostationary satellite (GOES) program, a one in-orbit polar satellite program and a request for Landsat funding that will be offset by user fees.

Included in the NESS budget are: $62,859 million for GOES spacecraft, launching and ground systems—no change in the fiscal year 1983 requirement as projected in the fiscal year 1982 budget; and $25,641 million for Polar spacecraft, launching and ground systems—a decrease of $24,665 million from the fiscal year 1982 budget.

The monies in the above two items will be transferred to NASA which continues to act as NOAA's technical manager for procurement and launch of operational satellites. NASA's Goddard Space Flight Center maintains project teams to manage the GOES and polar orbiting spacecraft programs.

$14.955 million for the land remote sensing satellite system—all of which is expected to be recovered through offsetting non-Federal user fees. NASA has funded, and is continuing to fund in fiscal year 1983, the capital costs of Landstat D and D' and the ground processing system for the Landsat D satellites, including data acquisition, preprocessing, and spacecraft command and control. NASA is planning to launch Landsat D in July 1982 after which they will perform in-orbit checkout and evaluation during approximately 6 months before turning over command and control of the satellite and its Multispectral Scanner to NOAA early in fiscal year 1983.

Also included in the $151.498 million request are: $41.521 million to fund meteorological satellite operations and data services and $6.522 million to support research and development—representing no change in the fiscal year 1983 base.

Geostationary satellites.—The fiscal year 1983 budget request of $62.859 million maintains the two-satellite configuration for GOES which is critical to provide repetitive viewing of the development and movement of destructive weather systems over much of the Western Hemisphere. Although the budget identifies an increase of $35.464 million over the fiscal year 1982 budget, this amount actually represents a continuation of the procurement for GOES satellites already underway, and is not an enhancement to the budget. In summary, the GOES budget request entails:

No change from the fiscal year 1983 requirement as projected in the fiscal year 1982 budget.

An increase from fiscal year 1982 to fiscal year 1983 due to the normal expenditure rate for GOES G and H spacecraft which will be purchased starting in fiscal year 1982. The planned launch date for GOES G is fiscal year 1986.

A $7 million ground system request for compatibility with changes being implemented by NASA in their communications network. In order to support the Space Shuttle and the new Tracking and Data Relay Satellites.

Polar satellites.—The fiscal year 1983 budget request of $25.641 million for polar spacecraft, lauching and ground systems represents a reduction of $24.665 from the fiscal year 1982 base. This request reflects the proposal to reduce polar coverage from a two to a one-spacecraft system with replacement launches planned for 18-month intervals. The request allows for the delay of NOAA H through J spacecraft procurement to fiscal year 1984. NOAA expects to save approximately $271 million in Federal expenditures over the life of the revised polar-orbiter spacecraft launch plan (by 1982) while still providing coverage of essential weather information needed by the United States. The requested budget will enable: Environmental testing and launch of NOAA E; fabrication, integration and testing of NOAA D through G; sensor procurement for NOAA H through J; detail design study to modify NOAA H through J for the Shuttle launch; continued refurbishment of Atlas F launch vehicles; and improvements in operational effectiveness of the data processing system.

Operations and research.—In addition to the amounts requested for weather spacecraft procurement, described above, the budget also contains $41.521 million for weather satellite operations and $6.522 million for supporting research and development. The operations budget pays for operation and maintenance of the command and control facilities, including contractor personnel at Wallops Island, Virginia, and Gilmore Creek, Alaska; Satellite Field Services Station operations in Washington, DC, Miami, Kansas City, San Francisco, Anchorage, Honolulu, and Slidell; and facilities for centralized data processing and analysis. The R&D budget, maintained at the same level as fiscal year 1981–82, provides research in the development of new and improved methods of obtaining satellite data and more effective uses of the data in environmental monitoring, prediction, and warning.

Landsat.—NOAA is requesting a fiscal year 1983 appropriation of $14.955 million to support its operation and management of the U.S. Landsat system. The total U.S. budget requested for Landsat operations in fiscal year 1983 is $24.740 million. The funds will be used to contract for management of the ground system at the Goddard Space Flight Center; to reimburse the Department of Interior's EROS Data Center at Sioux Falls, South Dakota, for the archiving of Landsat data and the provision of retrospective and other data services; and for NESS' management of the program. The difference between the amount NOAA is requesting and the total Federal government request will be reflected in the budgets of Federal user agencies, including the Department of Agriculture ($7.414 million) and the Department of Interior ($200,000). These agencies will then reimburse NOAA for their respective shares of the Landsat operating costs.

NOAA hopes to recover the total amount of its Landsat appropriation from sales of Landsat data to non-Federal users. The revenues so collected will be paid into the U.S. Treasury to offset the appropriation. In this manner the United States for the first time will put the operational portion of the Landsat program on a cost recovery basis.

The National Weather Service serves as the financial manager of the AgRISTARS Program; so in addition, NESS has received or will receive $1.035 million in each of the three fiscal years to conduct its part of this activity.

DIRECT SPACE ACTIVITIES

[Thousands of dollars by fiscal year]

	Actual 1981	Available 1982	Estimated 1983
NOAA appropriation	87,216	124,799	151,498
From NASA	985	500	700
Other agencies	1,200	1,200	11,150
Total	89,401	126,499	163,348

BERING SEA FISHERMAN'S ASSOCIATION,
Anchorage, Alaska, May 3, 1982.

Senator ROBERT PACKWOOD,
Senate Commerce Committee,
U.S. Senate,
Washington, D.C. 20510

DEAR SENATOR PACKWOOD: Last week, the Senate Commerce Committee held oversight hearings on the Magnuson Fishery Conservation and Management Act. Unfortunately, neither the Bering Sea Fisherman's Association nor Nunam Kitlutsisti was able to attend and participate at the hearing. Consequently, we appreciate the opportunity to submit written testimony at this time.

The Bering Sea Fisherman's Association is a non-profit corporation which provides technical assistance to the fishermen of western Alaska. Nunam Kitlutsisti is a non-profit corporation operating out of Bethel, Alaska, and was formed to formulate and carry out resource policy for the fifty-six predominately Yup'ik Eskimo villages of southwest Alaska.

These two organizations have submitted amendments to the Committee (copy attached) for your consideration. The first amendment is intended to explicity state in the Act that existing domestic fisheries are not to be adversely impacted by the developing domestic bottom fish fishery, especially off Alaska. Amendments to the Act by the 95th Congress added language to both the findings and purposes subsections (Secs. 2(a) and (b) which show Congressional intent that development of fisheries which are underutilized or not utilized by domestic fishermen, including bottom fish off Alaska, should be encouraged. Yet, there is no language included which qualifies this development to areas and methods where it will not adversely impact established domestic fisheries.

As an example, efforts have been made in the past several years to limit the incidental catch of prohibited species by the foreign bottom fish fishery in the Bering Sea. Limiting this catch will increase the earnings of small boat local fishermen in the western Alaska king salmon, western Alaska herring, and Bering Sea halibut fisheries. Success in these efforts should not be sacrificed in order to encourage other fishermen to enter the groundfish fishery. Both existing and developing fisheries should be able to exist in a compatible manner. In order to foster this relationship, the Act should be clear that developing fisheries, in order to become economically feasible, are not to become so at the expense of the established domestic fishing industry.

The second amendment is to Section 305(d) of the Act dealing with judicial review of regulations. Two limitations on judicial review contained within that subsection should be deleted. The first concerns the inability of litigants to obtain preliminary relief. The second imposes a thrity-day limitation from the time of final promulgation of regulations for the institution of judicial review. Each are onerous requirements which frustrate the policy of the Act which encourages responsiveness to the needs of the citizens of the United States (Sec. 2(c)(3)).

The first problem, the inability to obtain preliminary relief, may prevent a court from providing any relief during the period when a regulation may do its most damage. As an example, western Alaska fishermen sued the Secretary of Commerce over the promulgation of a regulation increasing the optimum yield for herring from approximately 18,000 metric tons to over 41,000 metric tons. This regulation became effective at the beginning of 1980. However, the time when most herring are taken in the Bering Sea by the foreign bottom fish fishery is during the winter months. Consequently, had the court refused to hear the issue on the merits in an expedited manner (some district courts refuse to do so) the fishery would have been completed before the opportunity for the court to provide any effective relief. What purpose is there to this roadblock being placed in the path of domestic fishermen? In this case, the failure to expedite the trial on the merits would have insulated the foreign fishery at the expense of a developing domestic fishery. Elimination of this inability to receive preliminary relief would enable the court to provide relief during a time when that relief may be important.

The second problem, the requirement that all litigation challenging a regulation be instituted within thirty days of its promulgation should also be deleted. As an example, a regulation promulgated in 1977 providing for the catch of prohibted species did not provide a cause of action until factual information became available some three years later. Yet, the case was dismissed because it was not filed during 1977. This is unfair on two accounts. First, tracking the regional fishery councils and the Secretary of Commerce is a time-consuming and expensive proposition. Many times actions which were taken will raise issues to a user group which had no knowledge of nor interest in the regulation at the time it was adopted. Second, new information or data may become available which indicates that the effect of the regulation is illegal. In both instances that the effect of the regulation may be immune from challenge. If there is a problem with these regulations, no matter when they were adopted, they should be subject challenge and not cast in concrete. Certainly, fishery management should be based upon a degree of certainty. However, this can work to the disadvantage of a domestic user group and actually act to impede its development. In the case of the Bering Sea, as most fishery regulations were intended to regulate the foreign fishery, this prohibition on filing suit actually works to institutionalize the foreign fishery at the expense of the domestic fishery. It also penalizes latecomers who had neither the interest nor the resources to protect interests they might not even know that they prossessed.

These amendments do not involve major changes to the intent or thrust of the MFCMA. What they do is try to protect the established domestic fishery. While this is clearly and underlying purpose of the Act, it is frustrated by language concerning the development of the domestic bottom fish fishery off Alaska and the limitations on judicial review.

We appreciate the consideration of these amendments by the Senate Commerce Committee. I you have any comments or questions please feel free to contact our offices.

Very truly yours,

Henry V. E. Mitchell.
Nunam Kitlutsisti,
Norman A. Cohen.

Enclosure.

Amendments to the Magnuson Fishery Conservation and Management Act

Sec. 2(a)(7) is amended to read: "A national program for the development of fisheries which are underutilized or not utilized by the United States fishing industry, including bottom fish off Alaska, is necessary to assure that our citizens benefit from the employment, food supply, and revenue which could be generated thereby; *provided however,* that such program shall have no adverse impact upon established United States fisheries."

Sec. 2(b)(6) is amemded to read: "to encourage the development by the United States fishing industry of fisheries which are currently underutilized or not utilized by United States fishermen, including bottom fish off Alaska; *provided however,* that this development shall have no adverse impact upon established United States fisheries."

Sec 305(d) is amended to read: "Judicial Review.—Regulations promulgated by the Secretary under this Act shall be subject to judicial review to the extent authorized by, and in accordance with, chapter 7 of title 5, United States Code, (if a petition for such review is filed within 30 days after the date on which the regulations are promulgated); except that ((1) section 705 of such title is not applicable, and (2)) the appropriate court shall set aside such regulation on a ground specified in section 706(2) (A), (B), (C), or (D) of such title.

Pacific Seafood Processors Association,
Washington, D.C. May 7, 1982.

Hon. Bob Packwood,
Chairman, Committee on Commerce, Science, and Transportation,
U.S. Senate, Washington, D.C.

Dear Mr. Chairman: The Pacific Seafood Processors Association (PSPA) appreciates this opportunity to comment on certain provisions of the Magnuson Fishery Conservation and Management Act (MFCMA) as contemplated for amendment by "Staff Working Draft 2" of April 22, 1982. We would enjoy having these comments entered for the legislative record.

PSPA is a trade association composed of seafood processing companies located in Oregon, Washington, and Alaska, and thus, is concerned with the conservation and management of our fisheries resources. In general, we find your efforts to improve the procedures of the MFCMA by which we manage the resources, to be of value, and we support this endeavor. Rather than attempting to address each section of the Staff Draft, we shall note those provisions that are of particular importance to our membership.

Reduction of allocation

Section 3 strengthens the "fish and chips" concept, which is of vital concern to processors in terms of world trade and exports of United States seafood products. We endorse this language. It gives the United States greater flexibility in determining allocations of our nation's fisheries resources based on cooperative actions by foreign nations that are operating in the United States fishery conservation zone. Because a key element in the domestic utilization of our fisheries is the ability to export into foreign markets, this provision should be of tremendous assistance in having acceptance of United States processed seafood a closer reality than currently exists. It is our sincere hope that the Secretaries of State and Commerce will focus more arduously on these trade aspects for processed seafood—Section 3 offers greater tools to do so.

National standards

The clear direction in Section 6 that guidelines, based on national standards for developing management plans, are not mandatory is a welcome addition to the law. We have experienced confusion in the past due to varying interpretations, and thus appreciate having this clarification in the statute.

Discretionary functions

We believe the thrust of Section 10 is beneficial in that the interaction between governmental entities, as well as that of user groups, is of considerable value when addressing operations in a common interest ocean area. It might be of additional worth if accompanying report language indicated an intent, where appropriate, to have the National Marine Fisheries Services (or other appropriate body, such as a state agency) communicate the same information as that of the Council, especially in situations involving contact with another governmental agency.

Public participation

In order to insure against unintentional actions resulting from the Federal Advisory Committee Act and other exemptions, we would appreciate an explanatory statement in the report as to what constitutes an emergency in Section 11.

Limited access

Section 12 provides boundless authority to establish buy-back programs for every fishery. While this generally would be a matter for harvester input, we believe the issue deserves attention by the entire fisheries community. A great number of critical points must be addressed before a buy-back program can be determined to be appropriate. We do not believe adequate attention has been given to the implications of this provision. For example: Who takes title to a vessel? Who may sell a vessel? Must there be a license moratorium in place first? Are licenses to be purchased also? What valuation process will be used? May a person return to the same fishery? Is spending and fee imposition limitless as implied by the bill? Are revolving funds to be established in the Department of Commerce to administer this program? We have many other unanswered questions that warrant attention before a provision of this nature is enacted.

Data collection

The issue of data collection from industry entities is of vital interest to seafood processors, and for that matter, to harvesters as well. The language in Section 14 addressing Council determinations to collect additional biological resources information regarding their management plan responsibilities is a fair and appropriate provision. PSPA prefers this program, rather than any other suggested provisions, because this type of data can serve legitimate, and more probably necessary, information needs.

An extensive history of the problems associated with broad, nonrestrictive collection ability has been established, which we can provide if so desired. Additionally, the questions of legal confidentiality of data and uses of the same have not been fully resolved, and thus, we remain wary of any efforts to mandate certain economic and private business-oriented data submission. We understand that voluntary, cooperative information exchange can possibly be useful to resource management systems and that such a design is the desired course of action. The submission of sensitive information, knowing that current confidentiality regulations are somewhat vague, should be a discretionary option, and not a directive within the context of the MFCMA.

Relationship with other laws

Section 17 proposes to reduce time and other procedural burdens in implementing management plans. We join our colleagues in supporting more expeditious and efficient conservation and management plan procedures. However, we do hope that the effect of these exemptions will not be a reduction in the ability to have any necessary and relevant considerations covered prior to final determinations.

Lastly, PSPA is aware that you are reviewing separately the issue of foreign processing vessels operating in internal waters of the various states. This is the primary legislative concern for our membership at this time, especially since our major fishing season is about to begin. We do sincerely request prompt Congressional action on this topic so that we will not face a potentially chaotic situation in the next few weeks. Again, the viability of the current processing community is the concern. Given the existing economic situation facing all businesses, and perhaps particularly these companies, every bit of support is urgently needed.

Thank you, and please call upon us for further information if so desired.

Sincerely,

M. KATHRYN NORDSTROM,
Washington Representative.

NORTHWEST POWER PLANNING COUNCIL,
Portland, Oreg., April 23, 1982.

Hon. MARK O. HATFIELD,
Chairman, Committee on Appropriations, U.S. Senate, Russell Senate Office Building, Washington, D.C.

DEAR MR. CHAIRMAN: At the April 22, 1982 meeting of the Northwest Power Planning Council (NWPPC) in Seattle, the Council unanimously decided to request your support in the appropriations process for the continued funding of federal Columbia River hatchery programs.

As you are aware, the Council is in the process of developing a system-wide fish and wildlife program for the Columbia River Basin and its tributaries. This program will be completed by November 15, 1982, and will be incorporated in the regional energy plan by April, 1983.

Until this program has been completed and until and unless alternative means of funding the hatchery programs can be formulated, it is essential that the federal funding of the anadromous fish enhancement programs in the Columbia River be maintained at their current levels.

Specifically, the National Marine Fisheries budget within the Department of Commerce, needs at least $11,000,000 to maintain its fiscal year 1982 production levels. The funding level proposed by the Office of Management and Budget (OMB) is only $5,700,000 for fiscal year 1983.

In the U.S. Fish and Wildlife Service in the Department of Interior, the fiscal year 1983 funding requirements to maintain the upper Columbia and lower Snake Rivers enhancement programs is $1,700,000. The OMB-proposed level is $1,100,000.

The estimated impacts of the Commerce and Interior Departments' reductions are roughly 27,000,000 less fish produced which leads to an economic impact to the fishery of approximately $52,000,000 in lost commercial and recreational value. These reductions also have substantial impacts on the operations of the Oregon Department of Fish and Wildlife. The Washington Department of Fisheries and the Washington Department of Game.

Therefore, the NWPPC strongly urges your support for the restoration of these funds in the ongoing appropriations process. The legislative history of the Northwest Power Act (P. L. 96–501) makes it clear that any Bonneville Power Administration funds applied to the protection, mitigation and enhancement of fish and wildlife resources are not to be in lieu of existing federal programs. Although the Council's fish and wildlife program most likely will apply BPA funds to the protection, mitigation and enhancement of the Columbia River Basin and its tributaries, until such time as the program is completed it is essential that the federal hatchery funds are maintained.

Finally, what is important to recognize in the case of the enhancement of anadromous fish stocks in the Columbia River Basin is that such enhancement will most likely not be undertaken by a single state, primarily because a single state is not guaranteed that it will recoup any of the benefits from such enhancement because of the migratory nature of the stocks. Therefore, enhancement of anadromous fish stocks must be undertaken at either the federal or regional level. The region is currently attempting to fashion a regional approach in the context of the Section 4(h) program. In the interim the federal effort in the funding of these hatcheries must be maintained.

Sincerely,

Daniel J. Evans,
Chairman, Northwest Power Planning Council.

United Fishermen of Alaska
April 29, 1982.

Hon. Bob Packwood,
Chairman, Committee on Commerce, Science and Transportation,
U.S. Senate,
Washington, D.C.

Dear Senator Packwood: The benefits reaped by Alaska's 35,000 small boat commercial fishermen from the passage of the Magnuson Fishery Conservation and Management Act have been immense.

The extension of U.S. fisheries management to 200 miles has taken the destructive foreign fishing fleets off immature and grazing salmon stocks, rich crabbing grounds, halibut nurseries, wintering areas and the most productive sablefish populations. Conflicts between American and foreign fishermen have been minimized, and international treaties negotiated in anticipation of the imposition of the 200-mile economic zone have given protection to Alaska's salmon resources on the high seas.

Loss of these important fisheries by the foreign fleets resulted in the creation of market demand for seafoods produced by shore-based plants and spurred much needed investments in U.S. processing operations. Although the transformation of Alaska's struggling salmon fisheries into a billion dollar a year, diversified seafood industry cannot be credited solely to the passage of the MPMCA, the legislation certainly was a decisive factor.

The United Fishermen of Alaska, which represents 18 local fishermen's groups and some 1,500 individual commercial fishermen, believes the U.S. has realized only a fraction of the economic and social benefits possible from these so called "developed fisheries," The state's salmon, crab, halibut and herring resources can be capped through careful management of foreign and domestic trawl fleets without veering from the MFCMA's stated goal of developing domestic bottomfish fisheries off Alaska.

When the MFCMA was drafted in the mid-1970s no one questioned the comitment of Congress to the established domestic fisheries; it was understood that the goal of the extension of our economic zone was to aid the existing seafood industry and provide it the opportunity for expansion.

The silence of the MFCMA on developmental goals for the established fisheries has lead to some uncertainty on the part of the regional fishery management councils. The MFCMA tipped the scales in favor of domestic fishermen, but it failed to provide adequate direction to fisheries managers for striking a balance between the established domestic fisheries and goal of replacing foreign trawlers with domestic draggers.

As you review the developmental goals of the MFCMA, we ask you to restate the commitment of Congress to the established fisheries. The regional management council and fisheries managers for generations to come will be guided by the language of the MFCMA; it is time to clarify the intent of Congress toward protection and expansion of established domestic fisheries.

The need to balance the developmental goals of the MFCMA between the established salmom, crab and longling fisheries and the rapidly emerging domestic trawl fishery can no longer be ignored. If only a portion of the joint venture goals for Alaska is realized this year, we will see a virtual explosion of trawl effort by U.S. fisherman off our coastline.

Alaska's small boat fishermen support the development of an offshore fishery on the "underutilized" species by Americans, but we believe it must be accomplished with a minmum of disruption of the more established domestic fisheries along the coastline and within the 200-mile zone. The progrsss made in recent years toward maximizing the domestic salmon, crab, halibut, herring and sablefish fisheries should not be lost in the push to replace foreign fleets with joint ventures.

The services of the UFA are at your disposal in attempting to work out suitable lauguage for amendments to the MFCMA and appropriate report language to accomplish this goal.

On the issue of enforcement, we are gravely concerned about the apparent increasing sophistication of the foreign fleets in escaping detection of violations within Alaska's 200-mile zone. The large number of seizures of Japanese vessels off our coastline for underlogging underscores the seriousness of the problem, but we suspect that only a fraction of offenders are being apprehended.

In conversations with federal fisheries managers and enforcement officials, it appears that many foreign vessels violating the terms of their permits are simply slipping out of our 200-mile zone to avoid boardings whenever U.S. Coast Guard patrols are in the area. Additionally, some federal officials say that some Japanese vessels apparently underlog the amount of processed fish transferred within our 200-mile zone to tramp freighters so they can scoop up more fish without entering them into the logbooks before making the next transfer or leaving our jurisdiction.

Considering the problems of obtaining sufficient funding for the U.S. Coast Guard's fisheries surveillance budget, the only method of cracking down on violators would be to increase the observer program to a 10 percent coverage level. The doubling of the observer program requested by the Reagan Administration this year should help, but it is not enough.

Section 22 of the April 19, 1982 "staff working draft 2" of MFCMA amendments clarifies that U.S. observers on foreign fishing vessels are responsible for "compliance monitoring." This amendment should bolster the effectiveness of the observer program as an enforcement tool.

Persistent reports by marketing agents for Alaska and Canadian fishermen's cooperatives about large numbers of illegally caught Alaska herring and halibut has led fishermen's groups to lodge complaints about the issue to the North Pacific Fishery Management Council. Those reports were brushed aside by U.S. enforcement officials and Japanese spokesmen as having no foundation in fact.

As the two attached letters indicate there is substance to the charges that significant numbers of illegally caught fish showing up in Japan. We submit that the 45.4 tons of illegal herring seized by the Japanese Ministry of Agriculture, Forestry and Fisheries (attachment #1) is just the tip of the iceberg. Significantly, the violation was uncovered only when U.S. officials in Japan received an anonymous phone call from a "person who described himself as a Hokucen crawler owner" (attachment #2)

Regarding the language of the section of draft MECMA amendment labelled "Review of Need for Plan" on page 9, this new subsection would lead to much wasted activity by the regional councils in cataloguing every fishery contained within its jurisdiction and justifying why it should or should not impose a fishery management plan on that particular fishery. There are numerous fisheries within Alaska's 200-mile zone that do not warrant the imposition of a fishery management plan and this proposed requirement would lead to unnecessary reams of paperwork by the North Pacific Fishery Management Council.

The UFA contends that the regional councils could be pursuing much more productive activities within the confines of its limited annual budget. We believe there is little justification for some of the fishery management plans already proposed by the NFFMC even without this burdensome unnecessary requirement to cover every fishery.

On a final note, the UFA would like to voice strong support to the efforts of Alaska Senator Ted Stevens to expedite action on the issue of foreign processing within state waters. As committee members are aware, the Alaska salmon industry is reeling from the recalls and embargos slapped on Alaska canned salmon as a result of the botulism death of the Belgian man and the dark cloud raised by the illness of a Connecticut woman.

Without the assistance of foreign processing vessels, Alaska will not be able to utilize the all-time record salmon runs expected to be hitting our waters within a matter of weeks. Despite the strong opposition raised in the past by the domestic processors to the use of foreign processing capacity of state waters, several processing companies recently have approached Alaska officials with requests to bring in foreign factory ships to handle anticipated surpluses of salmon.

The entire Alaska seafood industry needs to have immediate resolution of the question of whether foreign processors will be allowed to come into state waters. We request you to support Senator Stevens in his efforts to negotiate a national settlement through a free standing bill not attached to this package of MFCHA amendments.

Sincerely,

RODGER PAINTER.

Enclosures.

Fisheries Agency,
Ministry of Agriculture, Forestry and Fisheries,
Tokyo, Japan, February 22, 1982.

Mr. **William G. Gordon,**
National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, Washington, D.C.

Dear Mr. Gordon: I wish to confirm and supplement in this letter what I explained to you on February 17, 1982 concerning alleged violations of unlawful taking of herring by some Japanese trawlers in the Bering Sea FCZ.

With regard to the two vessels concerning which Mr. Iversen of the U.S. Embassy in Tokyo requested, in his letter of December 3, 1981 addressed to Mr. Inoue of my Agency, our Agency to investigate for their possible violation of unlawful taking of herring within the FCZ, we identified these to be Choun Maru No. 21 (MG1-837) and Rhujin Maru No. 8 (MG1-612). Our investigation revealed that both these vessels operated in that part of the Soviet zone in which the Japanese applicable regulation and terms and conditions issued to them prohibit them from operating. They also did not display properly their identification marks while they were in the area including the FCZ. This act also constitutes a violation of terms and conditions of the permit which our Agency issued to them. Therefore, our agency ordered them to stay at their home port for two months, or a two-month suspension of their permit. However, our investigation did not find either the fact that they actually engaged in any fishing activities within the FCZ or any intention for them to do so.

In our efforts to eliminate any violations regarding prohibited species, we have been carrying out continuing inspections at landing ports of land-based trawlers. The inspections by our Agency at those ports in October and November 1981 did not find any violation. However, around the end of the year, we found that the three vessels, Anyo Maru No. 8 (MG1-1052), Orient Maru No. 3 (FO1-324) and Fukuho Maru No. 18 (FS1-235) had unlawfully caught 7.7 tons, 20.2 tons and 17.5 tons, respectively of herring within the FCZ. We regarded such violations as grave and flagrant. Our Agency imposed each of them a four-month suspension of their permit, which was double the normal severity.

Our agency believes that such violations, if not rectified, would substantially undermine our credibility and that they would have far-reaching adverse effects on mutually friendly relations in the field of fisheries between the two nations.

With a view to reinforcing our effort towards the elimination of any such violation, the Fishery Agency will take following continued and additional measures:

(1) For any violation of taking of prohibited species within the FCZ which has occurred on and after January 1, 1982, our Agency

(i) will impose a six-month suspension of permit and

(ii) will not transmit to the State Department her application for the following fishing year to fish within the FCZ.

(2) In addition to the current practice of dispatching and maintaining a Japanese patrol boat in the fishing ground throughout the year, our Agency will cause two patrol vessels to maneuver for inspection covering landing ports for small trawlers any time during the six months of October through March, when incidental catch of herring is likely to occur.

(3) Our Agency will continue to instruct fish processors, brokers and wholesalers not to deal in herring which is suspected to have been caught unlawfully.

(4) Our inspection both at sea and ports will continue to include not only the catch but also the type of net. (The type of net directed at herring fishery is unique and can be easily identified compared with other trawl nets.)

Before concluding, I must refer to the rumor that Japanese trawlers may have unlawfully taken in 1981 as much as 20,000-30,000 tons of herring in the Bering Sea FCZ. This is totally unfounded and false. In 1981, Japan's catch in the East China Sea and Yellow Sea and its import combined of herring substantially increased by nearly 30,000 tons from the 1980 level. Accordingly, the Japanese market absorbed this magnitude of quantity and was correspondingly affected. This fact, I suspect, could have caused a misunderstanding and led to such a fallacy.

I fully appreciate attentive attitude which you and your colleagues have always extended to the efforts of our Agency and am looking forward to maintaining working closely with each other.

Sincerely yours,

Tatsuo Saito,
Councilor.

EMBASSY OF THE UNITED STATES OF AMERICA,
Tokyo, Japan, April 2, 1982.

Mr. KARL OHLS,
Editor, Alaska Fisherman,
Juneau, Alaska

DEAR MR. OHLS: This is in response to your letter of March 22, 1982 concerning illegal herring fishing in the U.S. 200 mile zone near Alaska.

The report that I accompanied Japan Fisheries Agency (JFA) enforcement officials on a "raid" during which several trawler operators were arrested is incorrect. At no time have I ever accompanied any JFA officials during any investigation.

The facts are as follows:

Japanese stern trawlers.—On November 5, 1981, a National Marine Fisheries Service special agent flying with the U.S. Coast Guard photographed two Hokuten (medium) stern trawlers at S6-36 N, 172-35 E, and at S2-41 N, 172-21 E. They had their names covered by nets and boards, and one of them had a fake identification number displayed. They were underway and no fish were seen on deck. The NMFS sent my office photographs of the two vessels with a request that we try to learn their identity. Some persons thought they might have been herring fishing.

On December 3, 1982 my office requested the JFA to investigate and to let us know the names of the vessels and any penalties they might have received for violating domestic Japanese fishing regulations. The JFA reported on January 14, 1982 that the two vessels were the Choun Maru No. 21 and the Ryujin Maru No. 8, both of Miyagi Prefecture. According to the JFA, neither vessel was licensed to fish in the U.S. 200 mile zone. They were licensed to fish in the Soviet 200 mile zone and, believing they had been spotted by a Soviet patrol boat, covered their names, etc. and tried to hide in the U.S. zone, where they were photographed by the NMFS on the USCG flight.

The JFA punished the two vessels by ordering them to be tied up in port for two months. The JFA stated they found no evidence to show the two vessels caught herring in the U.S. zone.

Illegal herring fishing. On December 2, 1981 my office received a call from a person who described himself as a hokuten trawler owner. He claimed that illegally caught herring was being landed in the port of Kushiro, Hokkaido Prefecture, and asked our office to ask the JFA to strengthen its administrative guidance against such violations.

On December 3, 1981, my office requested the JFA to investigate this allegation. On January 14, 1982, the JFA informed my office that its investigation had uncovered three cases of illegal landings of herring at the ports of Ishinomaki Maru No. 3, and the Fukuho No. 18. Each vessel was ordered tied up in port for four months, which is a very strong penalty against a hokuten trawler. The JFA said the amounts of herring involved were small, on the order of 20 tons.

The JFA held meetings December 25-27, 1981 in Sendai and Sapporo with the owners, chief fishermen, and captains of all hokuten trawlers, and said it would strengthen its enforcement efforts at the Landing ports starting January 1, 1982. When requested by the Embassy, JFA enforcement officials have been most cooperative in investigating alleged cases of illegal fishing or suspicious activities in the U.S. 200 mile zone.

I have no knowledge about the other issues raised in your list of questions.

Sincerely,

ROBERT T. B. IVERSEN,
Regional Fisheries Attache.

PACIFIC MARINE FISHERIES COMMISSION RESOLUTION NO. 6 [1]—CALIFORNIA REPRESENTATION ON THE PACIFIC FISHERY MANAGEMENT COUNCIL

Whereas, California has over one-half of the coastline within the jurisdiction of the Pacific Fishery Management Council; and

Whereas, the Pacific Fishery Management Council presently has management authority over the northern anchovy fishery, the groundfish fishery, and the ocean salmon fishery; and

Whereas, the northern anchovy fishery is conducted exclusively offshore of California by vessels whose home ports are in California; and

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[1] Adopted at Portland, Oregon, November 10, 1981, by a 3-2 vote of the five compact States: Alaska, California, and Oregon voting for; Idaho and Washington voting against.

Whereas, California groundfish landings over the last 10 years exceeded, on the average, those of other Pacific Coast states; and

Whereas, California salmon landings over the last 10 years, on the average, equal those of Oregon and Washington; and

Whereas, California is represented by 23% of the membership of the Pacific Fishery Management Council; therefore be it

Resolved, That the U.S. Congress be memorialized to increase California representation on the Pacific Fishery Management Council to two obligatory appointive seats.

NOWCASTING APPLICATIONS OF DOPPLER RADAR

(By James W. Wilson, National Center for Atmospheric Research,[1] Boulder, Colo., and Kenneth E. Wilk, National Severe Storms Laboratory, Norman, Okla.)

1. INTRODUCTION

In the past decade there have been major advances in Doppler weather radar and associated improvements in real-time signal processing and color display. A number of research facilities have been actively testing this new technology to remotely measure air velocities both within storms and optically clear air. As a result of this research a wide variety of Doppler radar applications to improve nowcasting and very short-range forecasting have been proposed. This paper reviews the field and presents specific examples of weather phenomena observed by Doppler radar and discusses how this information can be utilized in nowcasting. Examples are shown of weather phenomena observed by Doppler radars at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado, and at the National Severe Storms Laboratory (NSSL) in Norman, Oklahoma.

Multiple Doppler techniques are proving to be an extremely important method for observing storm kinematics. Three-dimensional fields of air motion are obtained by combining the radical wind components from two or more radars using techniques originally proposed by Lhermitte (1968) and refined by Armijo (1969). Ray, et al. (1980) demonstrated and compared several alternative schemes for deriving wind fields from multiple Doppler radars. However, multiple Doppler techniques are presently impractical for operational forecasting applications because of the large number of radars required for widespread coverage and the difficulty of combining data from multiple radars in real time. Fortunately, research field programs (Staff, 1979; Doviak, et al., 1979 and Wilson, et al., 1979) are showing that significant nowcasting information can be obtained from a single Doppler radar.

Since a Doppler radar directly measures only the wind component along the beam axis, interpretation of its displays are not straight-forward and requires training and experience using mostly pattern recognition techniques. Presently the identification of tornadoes, gust fronts, downbursts, and fronts can most easily be accomplished by the forecaster monitoring and interpreting the displays. Other Doppler products such as divergence, vertical and horizontal wind velocities, dangerous wind shear regions, movement vectors, and precipitation rates are easily obtained by computer. Effective Doppler interpretation in real time requires a man-machine mix, with the computer expected to take a greater share of the load as automatic pattern interpretation techniques evolve.

2. APPLICATIONS

Examples follow of weather phenomena observed by Doppler radar from clear air (non-precipitating), widespread precipitation and convective precipitation from a wide variety of locations in the United States. Doppler velocity applications will be emphasized here since the use of radar reflectivity for precipitation surveillance is discussed elsewhere in this volume. Descriptions of the NCAR and NSSL radars and color displays are given in Gray, et al. (1975), Brown and Borgogno (1980), Zahrai (1980), and Hennington (1980).

Generally the displays are in color; however, out of necessity they are presented in black and white in this volume thus significantly reducing the ease of interpretation. The reader is encouraged to look at the color figures in the Proceedings of the Nowcasting Symposium from which this paper was condensed. Also some of these same color pictures are in Wilson et al. (1980). Velocity and range ambiguities have been removed, as well as much of the ground clutter. These editing processes are accomplished with interactive computer techniques under development at NCAR (Oye and Carbone, 1981). Real-time signal processing techniques to accomplish some similar results are discussed by Doviak, et al. (1979).

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[1] The National Center for Atmospheric Research is sponsored by the National Science Foundation.

2.1 *Widespread precipitation*

2.1.1 *Wind vs. height*

Lhermitte and Atlas (1961) first described how a single Doppler radar could be used to measure profiles of wind velocity in widespread precipitation. Their techniques, which produces the Velocity-Azimuth Display, or VAD, involves rotation of the antenna while it is directed at a constant elevation angle to record radial velocity of precipitation particles at a fixed range versus azimuth.

Browning and Wexler (1968) presented a thorough analysis of the VAD technique showing how wind velocity, divergence, and deformation of the wind field can be obtained via harmonic analysis. Rabin and Zrnic (1980) have extended the VAD technique to apply to unevenly spaced data. Baynton et al. (1977) have described how wind information can be readily obtained visually from the Doppler color display.

Figure 1 is an example of a time-height profile of wind speed that was obtained by the VAD technique. Similar displays of wind direction, divergence, vertical velocity, and deformation are also possible. These displays can easily be generated in real time with small computers. Such information can be very useful in providing the forecaster with a real time physicial understanding of weather events.

Timely wind information could also be utilized by the nowcaster to update local orographic precipitation modals similar to those described by Hill and Browning (1981). Vertical wind profiles at each site from a network of Doppler radars would provide numerical models with the time and space wind information they require. Testud et al. (1980) have shown that the VAD technique can be used to detect the wavelength, amplitude, and direction of propagation of internal gravity waves. The identification and mapping of these waves by a network of Dopplers might be useful to predict storm initiation or intensification when intercepted by travelling gravity waves. Uccellini (1975) has indicated that such waves may be particularly important in triggering severe weather. Wilson et al. (1981) have also shown that the VAD technique can be utilized to estimate the average precipitation rate about the radar.

2.1.3 *Front location*

Sharp wind shifts, which are frequently associated with frontal boundaries are usually easily identified on the color velocity display. Thus, many fronts can be precisely located and their movement closely monitored. Figure 2 clearly shows the low-level wind shift associated with a cold front approaching the coast of Washington. In this geographic region accurate frontal locations are rarely known because data is sparse. Note that west of the radar the zero velocity band makes a sharp bend from about 290° to 360°. Along the sharp bend and extending to the southwest there is a close packing of the contours. This indicates a sharp change in wind direction from about 200° to 280°. From further inspection we estimate wind speeds of about 24 m/s and 15 m/s ahead of and behind the front, respectively. Assuming constant advection speed, the forecaster can accurately predict the time of frontal passage and wind velocity after passage.

Figure 3 is an example of a derived-weather display that can be prepared by the meteorolgist from the Doppler radar data using interactive graphical techniques. The computer derives the basic rainfall rate display from the reflectivity information. In this case, the relationship $Z=200R^{1.6}$ was used. However, adjustments can be based on known biases or real time rain gage information (Wilson and Brandes, 1979). The meteorologist may use a lightpen or similar technique to add significant weather information visually extracted from the Doppler velocity display. In this case, the cold front location and wind information were entered in this manner. The movement of the front can be derived by the computer based on a previous position that the meteorologist traced.

2.2 *Clear air*

The use of Doppler radar to obtain velocity measurements in the optically clear air was first reported by Lhermitte (1966) and Browning and Atlas (1966). Two principal sources of clear air return emerge from the literature. The particulate scatters in most cases appear to be insects. The number, concentration and total radar cross section of insects have been shown to be sufficient for routine observations using moderately sensitive radars at 3 and 5 cm wavelengths (Browning and Atlas, 1966), Glover et al., 1966 and Glover and Hardy, 1966). At radar wavelengths of 10 cm and longer, the dominant scattering mechanism appears to result from radio refractive index inhomogeneities in the atmosphere. In the planetary boundary layer, these inhomogeneities result principally from large local gradients of water vapor on the scale of one-half the radar wavelength.

Experience with the NCAR and NSSL 10 cm radars has shown winds can be obtained in the clear air boundary layer out to at least a range of 50 km essentially all the time during the six warmest months. Experience during winter is lacking. The NCAR 5 cm radars frequently observe widespread clear air return in the summer but only very rarely in winter.

Vertical profiles of the horizontal wind can easily be obtained utilizing the VAD technique or from visual inspection. The top of the mixed layer is typically associated with a sharp wind change that is readily evident from the velocity display. Monitoring of the mixed bundary layer height and winds provides much of the information required for air quality nowcasting.

Frequently we observe that a preferred region for thunderstorm initiation is along confluent regions in the clear air. These storms also have a tendency to move down these confluent boundaries while developing into major storms. These confluent regions are visible in the clear air return from the Doppler radar. Monitoring of the location of these boundaries is then an important nowcast tool.

Koscielny, et al. (1981) have demonstrated that a single doppler radar can qauntitively map the mesoscale divergence and deformation fields within the cloud-free convective planetary boundary layer. They demonstrated that strong convergence regions preceeded cloud and thunderstorm development by 1 to 4 hours. These fields, together with vertical profiles of the horizontal wond obtained from the prestorm environment, potentially are powerful tools for forecasting thunderstorm and severe storm development.

The routine detection of clear air echoes in the lowest 2–3 km of the atmoshpere during at least the six warmest months of the year points out the utility of meteorological Doppler radar for continuous monitoring of the convective boundary layer winds. It is likely that with a modest increase in sensitivity, state-of-the-art 10 cm radars may be able to measure winds in the optically clear air throughout the entire year. Clear air observations provide much of the information required for short-term air quality forecasting, and to pinpoint convergence areas that initiate deep, most convection (Harold and Browning, 1971). Once convective rainfall begins, gust fronts and other turbulent regions outside precipitation regions can be easily identified.

2.3 *Convective storms*

The success of Doppler radar for severe storm detection and warning lies in its ability to observe strong velocity gradients in range and in azimuth. Donaldson (1970) showed that data from one Doppler radar are sufficient to identify mesoscale vortices in the wind field. Subsequent work by Burgess (1976) and Brandes (1978) show these signatures are related to the mesocyclone in which tornadoes are frequently embedded and thus can be used for detection and warning.

To verify earlier research on the use of Doppler radar for severe storm warning, an operational test named the Joint Doppler Operational Project (JDOP) was initiated during the spring of 1977 in central Oklahoma. This test reported (Staff, 1979) that cyclonic signatures in the velocity field are precursor indicators of the severity of thunderstorms in Oklahoma and often are reliable indicators of tornadic storms. Numerous regions of cyclonic shear appear in the Doppler display; however, only the strongest and most persistent are likely to produce tornadoes. During JDOP, objective criteria were established for identifying tornado-producing mesocyclones involving shear magnitude and temporal/spatial continuity. When these criteria were met they provided an average 20 minute warning before tornado touchdown. Hennington and Burgess (1981) have automated the identification procedure for operational testing.

As indicated previously, we expect for the near future, that severe storm identification will be most effectively accomplished by human interpretation of color Doppler displays. Examples of severe storm features that could be identified by a meteorologist and annotated on a display follow.

2.3.1 *Tornadoes*

Large tornadoes at close radar range may be associated with very large azimuthal Doppler velocity shear referred to as the tornado vortex signature (Brown et al., 1978). Usually tornadoes are smaller than the plus volume and are not directly observed. However, they are frequently associated with mesocyclones and warning can be issued on the detection of the mesocyclone signature. This is particularly true for the larger and more long-lived "Killer" tornadoes. The signature of a mesocyclone is a couplet of closed Doppler velocity contours of opposite sign closely spaced in azimuth (2–15 km between centers). Detection of the mesocyclone is dependent on radar beam width, mesocyclone diameter, strength and range (Zrnic and Doviak, 1975). A typical maximum detection range is 150 km.

Figure 4a is an example of two tornado-producing mesocyclones that were observed in north-central Oklahoma on 2 May 1979. The large mesocyclone, centered at 28° and 60 km, has maximum approaching velocities of 32 m/s on the west side and 7 km to the east, the maximum receding velocities are 42 m/s (shear$=1.1\times10^{-2}s^{-1}$). At the center of the mesocyclone, there is a tornado vortex signature. Adjoining azimuths indicate speeds changing from -32 to $+42$ m/s. The other tornado-producing mesocyclone, centered at 5° and 45 km, shows a velocity couplet of -28 and $+21$ m/s separated by 5 km. Each mesocyclone produced a "hook echo" in the reflectivity display. In some cases, tornado warnings can be issued from the reflectivity display alone, but only after the tornado has formed. Many times hook echoes are not easily identified and hook shapes often exist without tornadoes and mesocyclones.

Figure 4b is the derived precipitation and significant weather display for the case of Fig. 4a. Superimposed on the rainfall rate display are locations of each tornado and its path during the past 30 min as derived from the velocity display. Those echoes in excess of 55 dBz are labeled as possible hail regions. Based on Fig. 4b and stored movement information, the computer can then produce another display (not shown) indicating downstream geographical locations that require warnings.

Small tornadoes, without mesocyclones, sometimes form along strong wind shear boundaries, such as gust fronts, downbursts and cold fronts, and are referred to as "gust front tornadoes." These types of tornadoes are more difficult to observe because of their small size and limited vertical extent. However, there is more evidence that they are likely to occur in those regions where the shear is the strongest. One such example is mentioned in the next section.

3.3.2 *Gust fronts*

Gust fronts are associated with downdrafts descending from the base of a cumulonimbus cloud that spreads horizontally within several hundred meters of the ground. Many times, this air has horizontal velocity which is much different from the low-level environmental flow. Consequently, gust fronts generally produce a line or arc of tightly packed velocity contours, indicating a band of strong convergence.

Figure 5a is an example of a gust front that occurred in Illinois on 17 June 1978. Just northwest of the radar, the zero velocity contour is along the 320° radial, indicating a wind direction of 230°. About 30 km from the radar, the zero velocity controur makes a sharp bend to the north, indicating a sudden veering of the wind. From this line of strong shear the gust front is easily traced to the north and northwest of the radar. It cannot be traced south of 300° because either the winds in front of and behind the gust front have similar radial components or the gust front does not exist. Behind the gust front, maximum winds are 32 m/s.

Figure 5b is the derived weather display for the case of Fig. 5a. Superimposed on the rainfall rate and hail display is the location of the gust front and strong horizontal winds. In this case, the gust front is closely associated with the leading edge of the precipitation. On occasion, the gust front may be 10–20 km in advance of the precipitation. Velocity measurements outside precipitation regions are available routinely during the spring and summer. The scattering mechanisms are normally associated with insects or refractive index fluctuations. Thus for locating gust fronts, it is often important that the radar have sufficient sensitivity to detect these "clear air" echoes.

For short period forecasting, it is important to monitor gust front locations since they often act as "triggers" for development of new storms or intensification of existing storms.

3.3.3 *Downbursts*

Downbursts are localized outflows from convective storms that cause damaging winds at the surface. They are similar to gust fronts in that they are associated with downdrafts from a cumulus cloud that spreads out into horizontal flow near the ground. Fujita (1981) reports that the width of downburst damage paths are generally less than 20–30 km. Fujita has further defined those with damage paths <4 km as microbursts. On the Doppler display downbursts product a roughly circular region of closed contours of high radial velocity. This signature is produced by the horizontal outburst of air and not the downdraft. Downbursts may occur within gust fronts or separately.

Figure 6a shows two downbursts within a general area of thunderstorm outflow air. The larger downbursts is located at about 155° in azimuth and 42 km in range. The velocity display shows that the air in the downburst is moving away from the radar at 25 m/s, while only about 5 km to the south and east of this location, the air is moving towards the radar at 12–16 m/s. A second, but smaller downburst (microburst) of similar magnitude, is observed at 163° and 48 km. The larger downburst rapidly moved towards the east-southeast causing the echo to bulge or form an arc-shaped echo ("bow echo"), as described by Fujita (1979). Ten minutes after the time of Fig. 6a, two small tornadoes developed on the leading edge of the largest downburst in the region of strongest shear. At the time of the tornadoes, the sear at the leading edge of the downburst was $3.5 \times 10^{-2} s^{-1}$.

Figure 6b is the derived weather display for this case. Superimposed on the rainfall rate and hail display is the location of the gust front, downburst and strong wind shear regions.

Figure 7 is a wind shear display for this case, indicating the magnitude of the radial shear in the Doppler velocity wind. Not shown but also computed is the azimuthal shear of the Doppler velocity. In this case the shear is computed over a distance of 1.9 km. Radial shear values of 1.5×10^{-2} sec^{1} are associated with each downburst. This type of display can be quite useful to the meteorologist in assessing the potential for shear-induced tornadoes and in locating mesocyclones. The tangential shear display is best for mesocyclone identification.

3.4 *Aircraft safety*

3.4.1 *Wind shear*

During the past few years, a number of aircraft accidents have occurred in the vicinity of thunderstorms. Fujita and Caracena (1977) and Fujita (1980) have examined six such cases. They concluded that in all cases the airplane encountered strong low-level wind shear during take-off or landing. The wind shears were seemingly associated with localized strong downdrafts (or downbursts) from thunderstorms which impacted the surface and then spread horizontally.

In the terminal area, a most important nowcasting application of Doppler radar would be to provide the pilots and controllers information on wind shear along approach and departure paths. We can envision a technique whereby Doppler-measured wind shears are obtained along the glide slopes and that information is given to a computer which contains a numerical simulation model for predicting aircraft performance. Such numerical models have been discussed by McCarthy, et al. (1980). The wind component of greatest concern to aircraft performance is that along and parallel to the glide slopes. This component can then be measured directly by a Doppler radar located at the airport. The distribution of the vertical wind component is also felt to be important, but only the areal average can be measured by a single radar. For the following applications, we are concerned only with measuring the wind component along the glide slope; thus, it is assumed that the radar is at the airport and that it is scanning along the glide slope. The change in wind speed along the glide slope is obtained by computing the change in the Doppler radial wind with range. The distance over which this computation is made should be commensurate with the spatial scale that is most important to aircraft performance. Numerical models (McCarthy et al., 1980) indicate that aircraft performance is most greatly affected by wind perturbations on a scale of the aircraft phugoid frequency. For jet aircraft similar to the Boeing 727, this is about 2.8 km.

For demonstration purposes, the change in radial wind was computed over a distance of 1.6 km. Pilots are most concerned with change in aircraft airspeed. This information can easily be obtained from a wind shear display (like Fig. 7) by multiplying the shear values by the aircraft speed. Figure 8 is a display of change in airspeed that a plane flying along the glideslope at 140 kts would experience on either approach or take-off. For this demonstration, it is assumed the radar is located at the airport. The hatched region simulates the area that a model utilizing the Doppler wind data as input predicts that a serious hazard would exist to aircraft operations. This example was obtained from a downburst that was approaching the radar on 29 May 1979 in northern Illinois. From this type of display, the approach of the hazard was quite evident and 10–15 min advance warnings could have been provided.

Area-wide displays like Fig. 8 can be continually provided to the tower, approach control, and to enroute air traffic control centers. Potentially hazardous areas would be clearly marked and when possible, their movement indicated. Flight specific information of the wind speed and expected air speed change along a given glide slope can be provided to the pilot. Figure 9 is such an example for a hypothetical approach from 218 deg at the time of Fig. 8. The wind speed and/or air speed change data for the glide path can be uplinked directly to the cockpit, thus providing suitable data for pilot-in-command decisions.

3.4.2 *Turbulence*

Lee (1979) suggests a strong connection between Doppler velocity spectral width measurements in thunderstorms and aircraft measurements of turbulence. During 45 thunderstorm penetrations with research aircraft there were 76 occurrences of moderate or greater turbulence, of which 95 percent showed Doppler spectral widths of 4 m/s or greater. The success of this technique depends on the turbulence being isotropic since the aircraft responds principally to vertical gusts and the radar senses horizontal gusts. Displays can be supplied controllers indicating those regions with spectral widths greater than 4 m/s.

While we see Doppler radar as the major input to the nowcast and short-range forecast, we strongly believe that it must be integrated with data from surface stations, radiosondes, satellites, and numerical weather computer forecasts. The forecaster should review synoptic scale analyses and forecasts and then, by taking into account local topographic influences, prepare a synopsis on how the weather events are likely to develop during his shift. With this background he should be better able to anticipate developments observed with the radar.

For example, we imagine the following scenario for an Oklahoma forecaster on the day shift during May. Upon arrival at work the forecaster reviews the morning radiosonde, synoptic scale analysis, computer forecasters and severe storm guidance from the National Severe Storm Forecast Center. He determines that the local air mass is too dry for thunderstorms; however, the development of a low in eastern Colorado is forecast and substantial moisture is expected to advect from Texas to central Oklahoma by midafternoon. Also, an area of positive vorticity advection aloft is forecast to arrive about the same time. Thus he concludes that thunderstorm development in the late afternoon is likely, with the possibility that some storms will become severe. As the day progresses he closely monitors the movement of moisture indicated by surface synoptic observations. From the Doppler clear-air returns he locates and tracks the movement of low-level convergence regions (Ogura and CHA, 1977) and areas of dry deep convection (Harold and Browning, 1971) where thunderstorms are most likely to form. When the low-level moisture is sufficient and/or satellite indicates cloud development, he issues forecasts of thunderstorms in the vicinity of these regions.

Also he utilizes the Doppler clean-air return to measure vertical wind shear and surface and upper-air temperature and moisture data to estimate stability in order to anticiapte the probable intensity of later thunderstorms (Marwitz, 1972; Fankhauser and Mohr, 1977). Once thunderstorms develop he monitors the Doppler for issuance of severe storm warnings. He examines mid-heights for mesoclones which are precursors to tornadoes. Lower heights are examined for signatures indicating gust fronts, downbursts, and exceptionally strong shear regions where gust front-type tornadoes may form. Reflectivity information is monitored for precipitation amounts, hail and flash flood potential. This obviously puts a considerable work load on a single person and might actually require two persons, a meteorologist and radar specialist. However, it is important that the meterologist spend considerable time examining the Dopper data.

Initially we would expect that most warnings will be based on the extrapolation of existing or imminent severe weather conditions identified by the forecaster, and the computer would be utilized to identify those downstream locations that need to be warned. Eventually we expect that the science will mature to where the "status quo" extrapolation short-period forcast will be modified by anticipating changes. Events that might be used to modify the "status quo" forecast are: storm splitting, storm motion curvature, history of new cell locations, interaction of storm outflow with other existing storms, and cut off of the storm inflow air by its own outflow or the intervention of another storm. We expect that as computers get larger and faster, mesoscale numerical models will begin to paly an important role in predicting these changes.

We believe that if significant advances are to be made in nowcasting that substantial changes will be required in weather service operations. An appropriate mixture of man/machine interaction will be needed to derive Doppler radar products. The nowcaster must be capable of integrating Doppler, satellite, surface and upper-air data and be highly skilled in mesoscale forecasting and knowledgeable about local topographic effects on weather events. Most importantly, efficient rapid dissemination procedures must be available to make available to users easily understood nowcast products.

5. ACKNOWLEDGMENTS

The authors would particularly like to thank Richard Oye of the NCAR Field Observing Facility (FOF) who developed the interactive computer programs for generating the displays.

The data used in this paper were from three field programs, all at least partically supported by the National Science Foundation. These were the University of Washington CYCLES Project, the University of Chicago NIMROD Project, and the radar portion of the SESAME Project.

The lead author would like to thank Richard Carbone and John McCarthy for many of the ideas and stimulation they provided, and to Edwin Kessler for his review of the paper.

We would like to thank Billie Wheat and Maggie Miller for FOF of typing the manuscript.

6. REFERENCES

Armijo, L., 1969: A theory for the determination of wind and precipitation velocities with Doppler radars. *J. Atmos. Sci., 25,* 570–573.

Baynton, H. W., R. J. Serafin, C. L. Frush, G. R. Gray, R. V. Hobbs, R. A. Houze and J. D. Locatelli, 1977: Real-time wind measurements in extra tropical cyclones by means of Doppler radar. *J. Appl. Meteorol., 16,* 1022–1028.

Brandes, E. A., 1978: Mesocyclone evolution and tornadic genesis: Some observations. *Mon. Wea. Rev., 106,* 995–1011.

Brown, R. C., and V. F. Borgogno, 1980: A laboratory radar display system. *Preprints 19th Conference on Radar Meteorology* (Miami), AMS, Boston, 272–277.

Brown, R. A., L. R. Lemon, and D. W. Burgess, 1978: Tornado detection by pulsed Doppler radar. *Mon. Wea. Rev., 106,* 29–38.

Browning, K. A. and D. Atlas, 1966: Velocity characteristics of some clear-air dot angels. *J. Atmos. Sci., 23,* 592–604.

Browning, K. A. and R. Wexler, 1968: A determination of kinematic properties of a wind field using Doppler radar. *J. Appl. Meteorol., 7,* 105–113.

Burgess, D. W., 1976: Single Doppler radar vortex recognition: Part I-Mesocyclone signatures. *Preprints, 17th Conf. on Radar Meteorology (Seattle), AMS, Boston, 97–103.*

Donaldson, R. J., Jr., 1970: Vortex signature recognition by a Doppler radar. *J. Appl. Meteorol., 9,* 661–670.

Doviak, R. J., D. S. Zrnic, and D. S. Sirman, 1979: Doppler weather radar: *Proc. of the IEEE, 67,* 1522–1553.

Fankhauser, J. C., and C. G. Mohr, 1977: Some correlations between various sounding parameters and hailstorm characteristics in northeast Colorado. *Preprints, 10th Conf. on Severe Local Storms* (Omaha), AMS, Boston, 218–225.

Fujuta, T. T., 1979: Objectives, operation, and results of project NIMROD. *Preprints, 11th Conference on Severe Local Storms* (Kansas City), AMS, Boston, 259–226

Fujuta, T. T., 1980: Downbursts and microbursts—An aviation hazard. *Preprints, 19th Conference on Radar Meteorology* (Miami), AMS, Boston, 102–109.

Fujuta, T. T., 1981: Tornadoes and downbursts in the context of generalized planetary scales. *J. Atmos. Sci.* (in press).

Fujuta, T. T. and F. Caracens, 1977: An analysis of three weather-related aircraft accidents. *Bull. Am. Meteorol. Soc., 58,* 1164–1182.

Glover, K. M., and K. R. Hardy, 1966: Dot angels: Insects and birds. *Preprints, 12th Conf. on Radar Meteorology* (Norman), AMS, Boston, 264–268.

Giover, K. M., K. R. Hardly, T. G. Konrad, W. N. Sullivan, and A. S. Michaels, 1966: Radar observations of insects in free flights. *Science, 154,* 967–972.

Gray, G. R., R. J. Serafin, D. Atlas, R. E. Rinehart, and J. J. Boyajian, 1975: Real-time color Doppler radar display. *Bull. Am Meteorol. Soc., 56,* 580–588.

Harrold, T. W., and K. A. Browning, 1971: Identification of preferred areas of shower development by means of high power radar. *Quart. J. Roy. Meteorol. Soc., 97,* 330–339.

Hennington, L., 1980: Reducing the effects of Doppler radar ambiguities. *Preprints, 19th Conference on Radar Meteorology* (Miami) AMS, Boston, 216–218.

Hennington, L. P., and D. W. Burgess, 1981: Automatic recognition of mesocyclones from single Doppler radar data. *Preprints, 20th Conference on Radar Meteorology, AMS, Boston (in press).*

Hill, F. F., and K. A. Browning, 1981: The use of climatological and synoptic data for forecasting orographic enhancement of rainfall. *Proceedings,* Nowcasting: Mesoscale observations and short-range prediction; International IAMAP Symposium, Hamburg, Germany, 207–212.

Koscienlny, A. J., R. J. Doviak and R. Rabin, 1981: Statistical consideration in the estimation of wind fields from single Doppler radar and application to prestorm boundary layer observations. *J. Atmos. Sci.* (in press).

Lee, J. T., 1979: Potential use of Doppler weather radar for real-time warning of weather hazardous to aircraft. *J. of SAFE Assoc., 9,* 7-11.

Lhermitte, R. M., 1966: Probing air motion by Doppler analysis of radar clear air returns. *J. Atmos. Sci., 23,* 575-591.

Lhermitte, R. M., 1968: New developments in Doppler radar methods. *Preprints, 13 Conference on Radar Meteorology* (Montreal), Boston, 14-17.

Lhermitte, R. M., and D. Atlas, 1961: Precipitation motion by pulse-Doppler radar. *Preprints, 9th Conference on Radar Meteorology (Norman), AMS, Boston, 218-223.*

Marwitz, J. P., 1972: The structure and motion of severe hailstorms: Parts I, II, and III. *J. Apl. Meteor., 11,* 166-201.

McCarthy, J., W. Frost, B. Turkel, R. J. Doviak, D. W. Camp, E. F. Blick, and K. Elmore, 1980: An airport wind shear detection and warning system using Doppler radar. *Preprints, 19th Conference on Radar Meteorology* (Miami), AMS, Boston, 135-142.

Ogura, Y., and Y. Chen, 1977: A life history of an intense mesoscale convective storm in Oklahoma, *J. Atmos. Sci., 34,* 1458-1461.

Oye, R., and R. Carbone, 1981: Interactive Doppler editing software. *Preprints, 20th Conference on Radar Meteorology,* AMS, Boston, (in press).

Rabin, R., and D. Zrnic, 1980: Subsynoptic-scale vertical wind revealed by dual Doppler-radar VAD analysis. *J. Atmos. Sci., 37,* 644-654.

Ray, P. J., C. L. Conrad, L. Zietler, W. Bumgarner, and R. Serafin, 1980: Single- and multiple-Doppler radar observations of tornadic storms. *Mon. Wea. Rev., 108,* 1607-1625.

Staff, NSSL, AFGL, NEW and AWS, 1979: Final Report on the Joint Doppler Operational Project (JDOP) 1976-1978. *NOAA Tech. Memo. ERL NSSL-86.* Norman, Okla., 84 pp.

Testud, J., G. Bregar, P. Amayenc, M. Chong, B. Nutten, and A Seuvaget, 1980: A Doppler radar observation of a cold front: Three dimensional air circulation, related precipitation system and associated wave-like motions. *J. Atmos. Sci., 37,* 78-98.

Uccellini, L. W., 1975: A case study of apparent gravity wave initiation of severe convective storms. *Mon. Wea. Rev., 103,* 497-513.

Wilson, J. W., and E. A. Brandes, 1979: Radar measurement of rainfall—A summary. *Bull. Am. Meteorol. Soc., 60,* 1048-1058.

Wilson, J., R. Carbone, H. Baynton, and R. Serafin, 1980: Operational Application of Meteorological Doppler Radar. *Bull. Am. Meteorol. Soc., 61,* 1154-1168.

Wilson, J., R. Carbone, and B. Ramsay, 1981: Precipitation and precipitation efficiencies derived from single Doppler radar. *Preprints, 20th Conference on Radar Meteorology,* AMS, Boston (in press).

Zahrai, F. A., 1980: Real-time Doppler radar data processing and display. *Preprints, 19th Conference on Radar Meteorology* (Miami), AMS Boston, 211-215.

Zrnic, D. C., and R. J. Doviak, 1975: Velocity spectra of vortices scanned with a pulse-Doppler radar. *J. Appl. Meteorol., 14,* 1531-1539.

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Figure 1.—Time-height profile of horizontal wind speed derived from a Doppler radar; for a 6 hour period on 4 March 1979 at Ocean Shores, Washington. Similar profile for wind direction, divergence and vertical velocity were also obtained using the VAD analysis technique.

Figure 2.—Doppler velocity display of a cold front approaching Ocean Shores, Washington. The display shows a near surface sharp wind shift line 40 km west of the radar. Note the sharp bend in the zero contour and close packing of the contours. Winds east of the front about 150 m above the surface are 200° at 24 m/s and west of the front 280° at 15 m/s.

Figure 3.—Derived weather display for the case in Fig. 2 indicating rainfall rate, location of cold front, front movement and near surface wind velocity on either side of the front. This display was generated from Doppler radar data using an interactive computer, color graphics display system.

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Figure 4b.—Man-machined derived weather display of precipitation and significant weather for the case of Fig. 4a. The gray shades indicate precipitation rate and possible location of hail. The letter T indicates tornado location and the white line their past 30 min. path as derived from the Doppler velocity display.

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Figure 6a.—Doppler velocity display of two downbursts and a gust front in northern Illinois on 25 June 1978.

Figure 6b.—Man-machine derived display of precipitation and significant weather for the case of Fig. 6a. The solid black line indicate the location of the gust front, the D's the location of the downbursts and the arrows the location of strongest wind shear.

Figure 7.—Wind shear display (10^{-2} sec $^{-1}$) for the case of Fig. 6a. The shear is that of the Doppler velocity computed radially over a 1.9 km distance. Positive values indicate increasing radial velocity with decreasing range.

Figure 8.—Display of aircraft airspeed change (kt/sec) that a plane flying at 140 kt would experience on approach or take-off along the glide slope. For this example it is assumed that the radar is located at the airport. The display is generated from Doppler data collected during a downburst on 29 May 1978 in Illinois. The hatched region indicates the area where a serious hazard to aircraft is predicted.

Figure 9.—Example of windspeed (solid line) and aircraft airspeed change (dashed line) versus distance from the airport that can be provided a pilot from a Doppler radar located at the airport. This is the same case as Fig. 8 for a glide slope along the 218° radial.

Figure 1

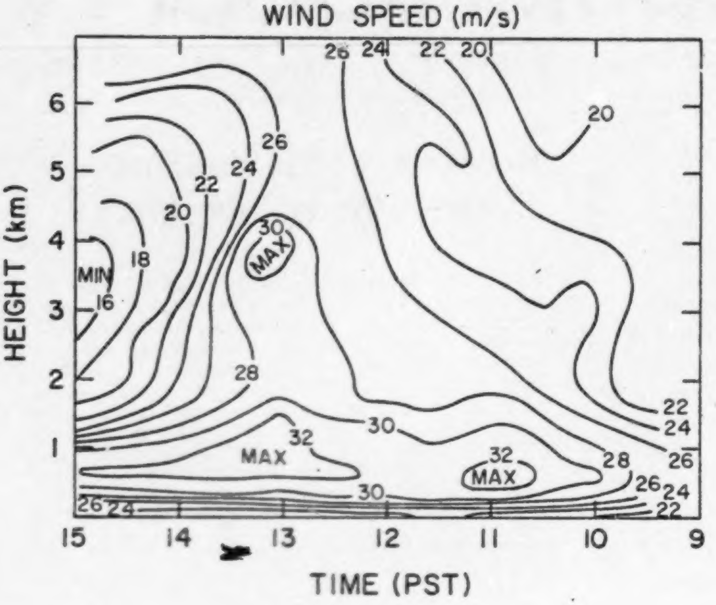
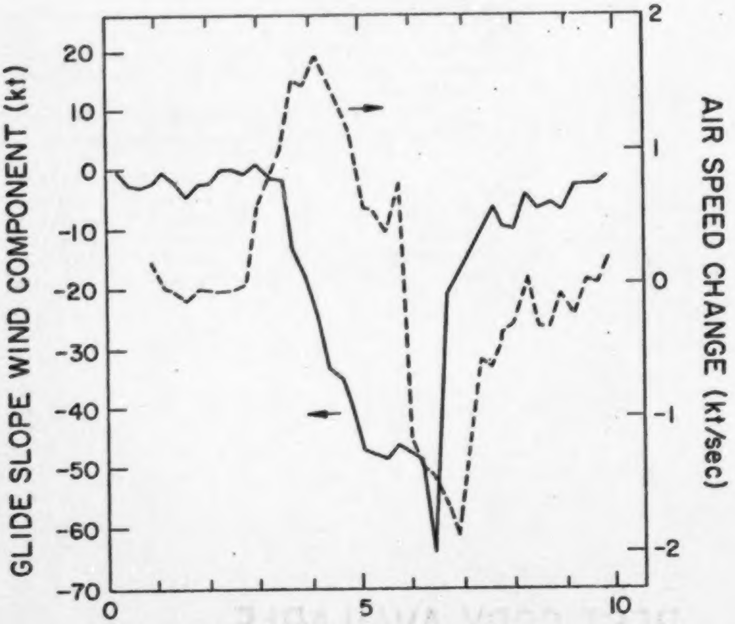


Figure 9



Doppler Radar

Research at the National Severe Storms Laboratory

By PETER S. RAY,
RODGER A. BROWN
AND CONRAD L. ZIEGLER

New Tool for Storm Detection

MANY TOOLS AND TECHNIQUES CONTRIBUTE to our increased understanding of how severe storms form and evolve. Shortly after World War II, it was recognized that a well calibrated radar could measure the strength of thunderstorms. This is accomplished by transmitting a short pulse of electromagnetic energy and "listening" to the small fraction of energy scattered back to the radar by the storm. The strength of the returned signal is an indication of the rain's intensity and the possible presence of hail. The time difference between when the pulse is transmitted and returned tells the radar operator the distance to the echo. The process of transmitting and receiving is repeated many hundreds of times each second, so it is possible to obtain a detailed "map" of the storm as the radar's antenna scans past a storm's activity, which may be several hundred kilometers away. However, since the radars now in routine use only measure the intensity of the returned echo, estimates of hazards such as tornadoes, gust fronts, and turbulence are not possible by radar alone. An exception is the rare case when the large circulation in which tornadoes are imbedded establishes spiral patterns in the rain, giving rise to the well-known hook echo.

One of the most important newer tools in storm detection and study is the Doppler radar. A Doppler weather radar is like the conventional radar already mentioned, but has the added capability of detecting the speed of targets either toward or away from the radar. It does this by measuring the frequency change in the transmitted pulse caused by the target's motion, similar to the familiar police radar. An analogous change in frequency is apparent as a train passes you with its whistle blowing. These frequency changes are called Doppler shifts, from whence the Doppler radar gets its name. The use of Doppler radar has added a new dimension to severe storm research.

Since 1971, the National Severe Storms Laboratory (NSSL) has employed Doppler radars in its storm research program. One radar set located in Norman was used in early studies. By 1974, a second Doppler radar was added. This one was located 41 km to the west-northwest at Cimarron Airport near Yukon, Oklahoma. Through cooperative programs with the Illinois State Water Survey and University of Chicago (CHILL Doppler radar) and the National Center for Atmospheric Research, three and four Doppler radar experiments were conducted in 1976 and 1977, respectively. At least nine Doppler radars are expected to participate in

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Project SESAME (Severe Environmental Storms and Mesoscale Experiment) in central Oklahoma during Spring 1979. This article highlights some of the work done at NSSL on Doppler radar research. It is clear that we are entering the golden age of this tool's promise to better understand the dynamics and the effects of severe thunderstorms.

Single Doppler Radar Studies

In 1971, the National Severe Storms Laboratory began using a 10-cm wavelength Doppler radar to study flow fields within severe thunderstorms. Since then, the existence of two useful severe storm features with characteristic patterns of signatures have become apparent. The first was that of a mesocyclone–a vertical column of rising counterclockwise rotating air 10 to 20 km across. The mesocyclone signature or couplet, is observed to form in the mid-part of the storm and descend to cloud base with tornado formation. This behavior suggests the prospect of significant lead times in warnings. It is generally observed that the region of the storm where the mesocyclone occurs contains the major updraft, largest hail, strongest winds and tornadoes.

The second signature–tornadic vortex signature (TVS)–is produced by the tornado itself and is the location of very rapidly changing wind speeds in a region much smaller than that of the mesocyclone in which it is imbedded. The best documented TVS occurred with the 1973 Union City, Oklahoma tornado (Brown, et al., 1978). In that storm the TVS was detected aloft nearly half an hour before the tornado touched the ground. Several years experience with TVS's has demonstrated their great utility for determining tornado location with astonishing precision, usually within a kilometer.

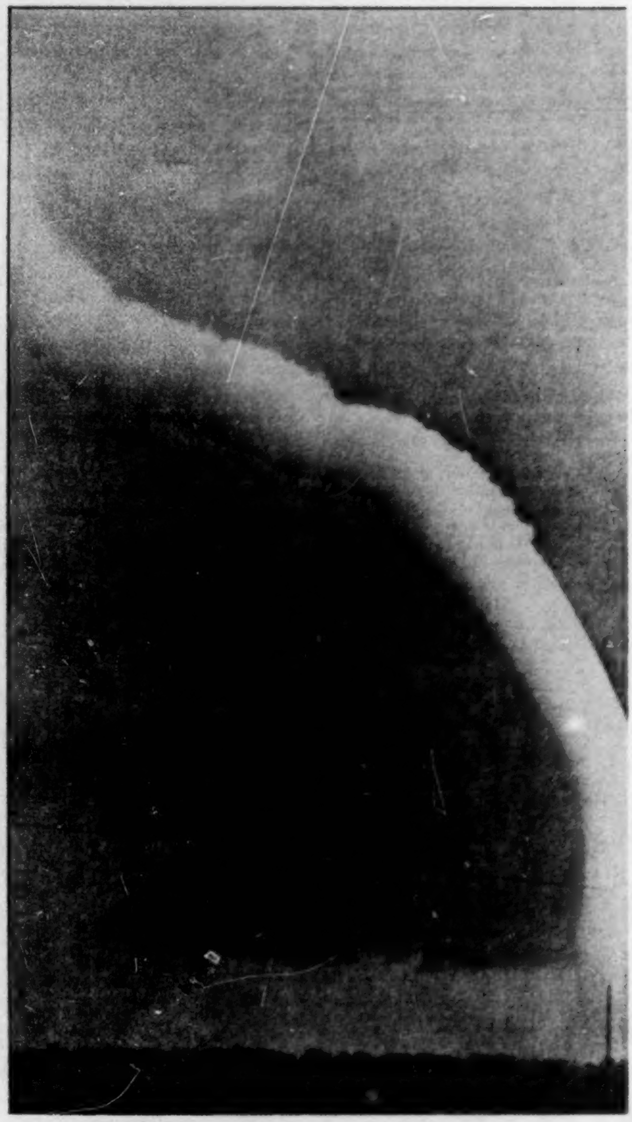


Figure 1. Stillwater tornado photograph (courtesy of Rick Bellati, Stillwater News-Press) taken at 1752 near end of surface damage. Note low cloud base region in background. From Burgess et al. (1976).

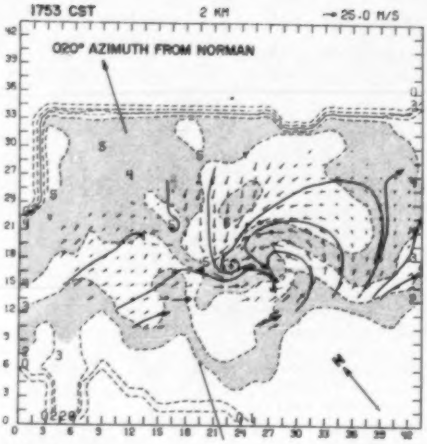
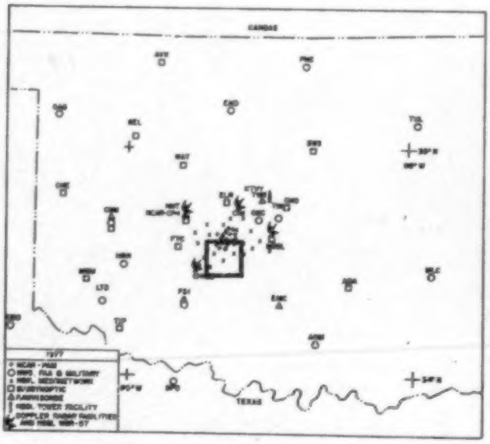


Figure 2. Dual-Doppler display for Stillwater storm. Velocities are relative to storm. Grid spacing is 1.5 km. Dark dot locates photographer Bellati and (+) marks tornado location. From Burgess et al. (1976).

The application of these techniques is discussed in a companion article in this issue by Burgess et al. (1979).

Dual Doppler Radar Measurements

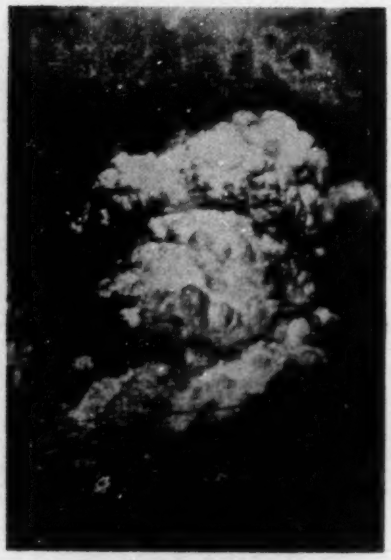
As useful as single Doppler radar measurements are, these measurements are limited to detailing only motions toward or away from the radar. For increased understanding of processes within storms, the advantages of being able to describe three dimensional air flow are obvious. The value of these motions, derived from two or more Doppler radars, further increases when they are related to complementary data from other sensors and information



One method of improving the wind field determination is by the addition of more radars. An opportunity to study a storm with three radars occurred on 29 April, 1977. This effort was part of a larger effort involving many observing tools during April and May 1977. The location of the radars and surface sites for the Spring Program 1977 is shown. A group of cells developed between the two NSSL operated Doppler radars and the CHILL radar, operated by the University of Chicago and the Illinois State Water Survey. As these cells were growing, the three radars simultaneously collected data to describe the air motions within these storms.

All the radar data were combined in a computer program to produce pictures of the airflow within these storms at the time the data were obtained. Since the storm was over instrumented surface stations, even these data were incorporated into the analysis.

Schematic shows radars, surface instrumentation, tower and rawinsonde site locations for the 1977 spring program. Analysis area is indicated by square. From Ray et al.



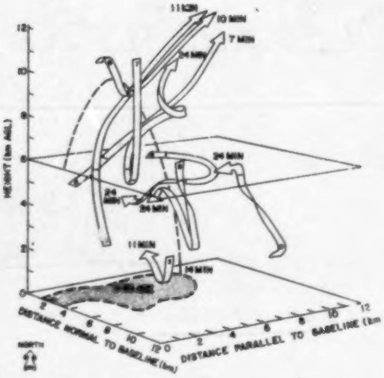


Figure 3. (left) Convection on west flank of Wynnewood storm as viewed by ground intercept teams near Elmore City, Oklahoma at 1655 looking east. From Ziegler (1978).

Figure 4. (right) Air (broad arrow) and hailstone (dashed line) trajectories in the storm core between 1719 and 1743. Total elapsed time of air trajectory at arrow head. Thin line denotes intersection of 6 km plane and air trajectory. Stippling shows location of surface radar echo core at 1719. From Ziegler (1978).

from observers, such as the Laboratory storm intercept teams. An example of this is found in a storm that occurred on 13 June 1975 near Stillwater, Oklahoma. Storms developed in late morning in north central Oklahoma ahead of a weak cold front. The storms became severe during the afternoon and evening. Early low level scans revealed the presence of a mesocyclone. Later, a tornadic vortex signature was detected aloft; this developed downward in concert with the occurrence of a tornado on the ground. The wind field at 2 km above the earth's surface is reconstructed in Figure 2. An interesting photograph from the ground, is shown in Figure 1. Note the tornado in the foreground and the wall cloud from the circulation to the southeast in the background.

Two Doppler radars were used to map winds within an isolated severe thunderstorm that developed on the afternoon of 28 May 1977 near Wynnewood in south central Oklahoma. The Wynnewood storm was unusual in that it produced large hail (up to 5 cm in diameter) while moving nearly 90° to the right of mid and upper level winds. Vigorous updrafts resulting from the pronounced instability that existed that day are obvious in Figure 3. Doppler data from the Wynnewood storm have been used to recreate air trajectories or to follow the path that a parcel of air might have taken. Starting points for these trajectories were located near the storm core at 3, 7, and 11 km above the ground as shown in Figure 4. For example, trajectory 1 traces the path of a parcel originating in the strong updraft at the 3 km level. During the first 2 minutes, the parcel experiences an upward velocity increase of 25 m s^{-1} while moving nearly vertically. As the parcel leaves the updraft near 8 km, it moves to the east with the winds at that level. It is evident that fastest air displacements occur in the updraft plume and the outflow. The slowest motions occur in decaying updrafts which are downwind from the strongest updraft.

REFERENCES

Brown, R. A., L. R. Lemon and D. W. Burgess, 1978: Tornado detection by pulsed Doppler radar. *Mon. Wea. Rev.*, *106*, 29-38.

Burgess, D. W., L. D. Hennington, R. J. Doviak and P. S. Ray, 1976: Multimoment Doppler display for severe storm identification. *J. Appl. Meteor.*, *15*, 1302-1306.

Burgess, D. W., K. E. Wilk, J. D. Bonewitz, K. M. Glover, D. W. Holmes, and J. Hinkelman, 1979: The Joint Doppler Operational Project. *Weatherwise*, 32, 72-75.

Ray, P. S., K. K. Wagner, K. W. Johnson, J. J. Stephens, W. C. Bumgarner and E. A. Mueller, 1978: Triple-Doppler observations of a convective storm. *J. Appl. Meteor.*, *17*, 1201-1212.

Ziegler, C. L. 1978: A dual Doppler variational objective analysis as applied to studies of convective storms. Master of Science thesis, Dept. Meteor., Univ. of Oklahoma, 115 pp.

For more information on research using Doppler Radar, see the following article page 72.

Doppler Radar

The Joint Doppler Operational Project

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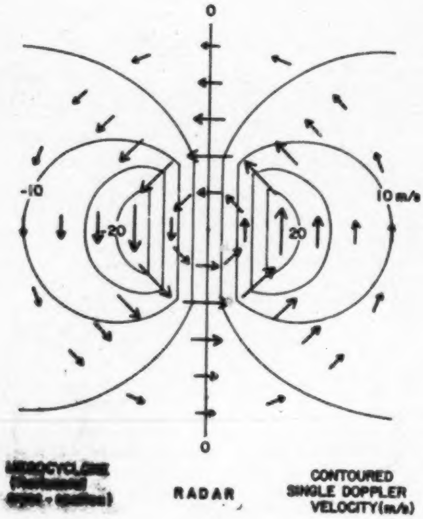
JACK HINKELMAN

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION components (Environmental Research Laboratories and the National Weather Service) have combined with Air Force components (Air Weather Service and the Air Force Geophysics Laboratory) and the Federal Aviation Administration to conduct an experiment to determine realtime Doppler capability and outline specifications of a new generation radar for national network use. This program is the Joint Doppler Operational Project (JDOP). It is founded in the Doppler technology development of the last decade. See Ray et al. (companion paper) for a summary of research with single Doppler radars and vortex signature recognition.



JDOP forecasters viewed color and graphics displays designed to identify severe storms. Storm advisories simulating public warnings were recorded for comparison with conventional techniques. Research aircraft flew in central Oklahoma to verify Doppler detected regions of turbulence. The project goal is to develop a new radar system which will improve public warnings of tornadic storms and provide better flight safety for aircraft.

Real Time Displays

Areas of rotation within thunderstorms appear as signatures in single Doppler velocity fields. During JDOP, forecasters viewed two display types: 1) a color-contoured picture of all storms within

Figure 1. Wind flow vectors for a mesocyclone with superimposed single Doppler velocity contours. One Doppler radar (at figure bottom in this illustration) sees only that component of motion parallel to the beam (vertical line from bottom to top of page) and is blind to motion perpendicular to the beam (across the page). The resulting signature, when a vortex is present, comprises closed contours of radial velocity toward the radar on the left (negative sign) and away from the radar on the right. The closed contours are separated by velocity contours parallel to the beam with included 0 $m\ s^{-2}$ contour. Signature with continuity is unique to a vortex and independent of viewing angle.

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range, and 2) a black and white graphics "window" within each storm likely to be severe. The first display is analogous to present-day displays of reflectivity except radial velocity mean value and velocity spectrum width can also be selected. The contours of all three parameters are presented in color on a refreshed computer-driven terminal.

Two versions of the color display are available. One has disk storage which allows retrieval of past displays for playback. The second includes radar echo tracks and forecast echo positions as an additional display parameter.

The black and white graphics display is a field of arrows where arrow length is proportional to intensity, arrow rotational position to mean velocity, and arrowhead size to velocity spectrum width. The display is unique in that it provides multiple data types simultaneously with resolution matched to the radar output over a specified limited area. Doppler velocity shears, important in signature recognition, are emphasized by arrow orientations and arrowhead size. It must be remembered that displayed velocities are the radial component of motion only and arrows should not be interpreted as streamlines of horizontal air flow.

Both displays are interactive. They permit the meteorologist to review three-dimensional data selectively, and then logically deduce the significance of the vertical distribution of reflectivity and velocity signatures.

Results

JDOP meteorologists identified, from Doppler, areas of storm rotation and possible tornado formation (mesocyclone and tornadic vortex signatures) and strong outflow winds below cloud base (gust front signatures). In addition, a measure of updraft strength and therefore hail potential was found in Doppler convergence signatures found near cloud base and Doppler divergence signatures found near cloud top. This information was transformed into severe thunderstorm and tornado advisories. National Weather Service offices and Air Force bases in Oklahoma, southern Kansas, northern and panhandle Texas and western Arkansas received the advisories by telephone. Because the Air Force Bases are point targets, only a few military advisories were issued.

Although some success was achieved in identifying mesocyclones at long range, out to 350 km, verification was attempted only to ranges of less than 230 km. Doppler advisories were compared to public warnings issued by the Weather Service Forecast office at Oklahoma City. The data contained in Table 1 were analyzed using the statistical technique of the Critical Success In-

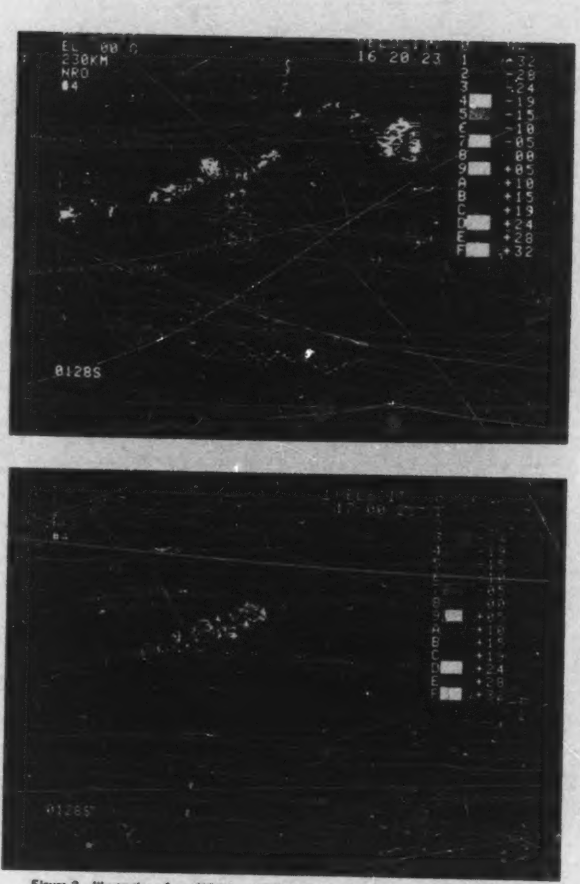

Figure 2. Illustrations from NOAA color display for a gust front on 28 June 1977. Display has date, elevation angle, range interval and time across top and color code along right side. Reflectivity (not shown) is comparable during 40 minute squall line evolution but velocity changes dramatically as downdraft forms in cell northwest of radar and gust front develops. Overlay has state boundaries, selected cities and 40 km (20 n mi) range marks.

dex (Donaldson et al., 1975). The technique gives credit for a high probability of detection and low false alarm rate with a CSI of 1.0 being perfect and 0.0 being no success.

A significant benefit in use of Doppler radar is the increased lead time available before tornado occurrence. Currently, many tornado warnings are based on public reports of tornado activity, whereas the Doppler radar detects rotating winds well up within the cloud an average of 20 minutes before the first damage. The probability of detection for tornadoes already on the ground is not improved with Doppler information, but specific location is.

In addition to increased lead time, a second advantage for both severe storms and tornadoes is the decreased false alarm rate. Doppler information should be helpful in reducing the overwarning inherent in the present "state-of-the-art."

Warning areas may be reduced significantly by having precise tornado location and forecast track information available. Mini-computer generated forecasts of future movement have proved extremely valuable to JDOP meteorologists in defining the threatened area.

> **"A significant benefit in the use of Doppler radar is the increased lead time available before tornado occurrence."**

Aircraft Hazards

Aircraft flew through Oklahoma thunderstorms to verify relationships between Doppler parameters and turbulence, vertical wind shear and gust fronts. Results verify a relationship between large values of velocity spectrum width and coincident detection of moderate to severe turbulence. This is a potential aid to aircraft flying in the vicinity of thunderstorm hazards.

Some recent aircraft accidents have been related to the thunderstorm downdraft and associated shifting winds in the low-level, cold air outflow. Doppler radar can detect storms with low-level hazards. Rapid change in horizontal wind direction and speed with height can also be detected by Dopplers in precipitation areas including thunderstorms.

The Future

The Joint Doppler Operational Project will continue during Spring 1979 in Oklahoma in conjunction with the Severe Environmental Storms and Mesoscale Experiment (SESAME 79). SESAME 79 is a cooperative effort with intensive data collection by many university and government groups interested in thunderstorm processes, and NSSL is host for the first field phase of the experiment.

In the more distant future additional application of Doppler technology to hydrology is also anticipated. This may provide better warning of dangerous flash flood situations.

The addition of Doppler capability will add significantly to cost as well as to benefits of our weather warning services. Attempts to accomplish an operational system include development of automated signature recognition and identifi-

Table 1

CRITICAL SUCCESS INDEX ANALYSIS OF SEVERE STORM DATA

X = Forecast severe event which occurs
Y = Forecast severe event which doesn't occur
Z = Forecast non-severe event which occurs severe
LT = Lead time between advisory/warning issuance and event occurrence (minutes)

$$\text{Probability of Detection (POD)} = \frac{X}{X+Z}$$

$$\text{False Alarm Ratio (FAR)} = \frac{Y}{X+Y}$$

$$\text{Critical Success Index (CSI)} = \frac{X}{X+Y+Z}$$

Hail and Wind 1978

OKC WSFO	NSSL Doppler
POD = .47	POD = .70
FAR = .40	FAR = .16
CSI = .36	CSI = .62
LT = 13.6 min.	LT = 15.4 min

Tornado 1977-1978

OKC WSFO	NSSL Doppler
POD = .64	POD = .69
FAR = .63	FAR = .25
CSI = .30	CSI = .56
LT = 2.2 min	LT = 21.4 min

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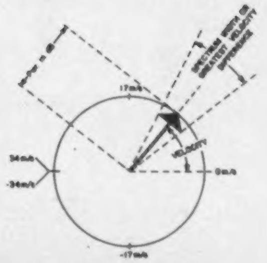
cation of possible regional differences in radar capability. The nationwide deployment of a new generation radar network is still several years away.



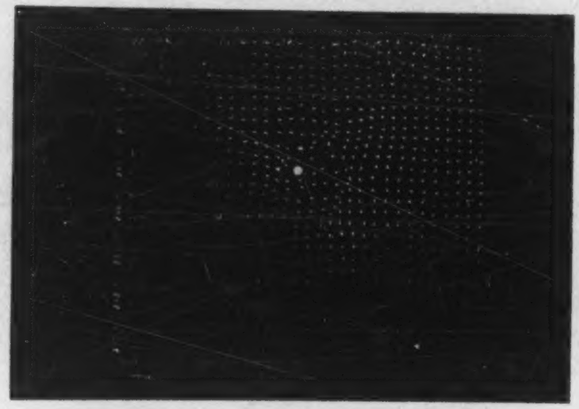


Figure 4. Black and white graphics display explanation (a) and illustration (b) from tornadic storm of 30 April 1978. Arrow length is proportional to received power, arrow direction of velocity and arrowhead size to Doppler spectrum width (from Burgess et al., 1976). Arrows pointing right indicate zero radial velocity. In (b), radar is toward bottom of page with range (km) at left and azimuths below display. Tornado and tornadic vortex signature (white dot) are located near 334° azimuth and 49 km range with mesocyclone couplet visible in surrounding azimuths.

REFERENCES

Brown, R. A., L. R. Lemon and D. W. Burgess, 1978: Tornado detection by pulsed Doppler radar. *Mon. Wea. Rev., 106,* 29-38.

_______, W. C. Bumgarner, K. C. Crawford and D. Sirmans, 1971: Preliminary Doppler velocity measurements in a developing radar hook echo. *Bull. Amer. Meteor. Soc., 52,* 1186-1188.

Burgess, D. W., 1976: Single Doppler radar vortex recognition: Part I, Mesocyclone signatures. *Preprints,* 17th Conf. on Radar Meteor. (Seattle), AMS, Boston, 97-103.

_______, L. R. Lemon and R. A. Brown, 1975: Tornado characteristics revealed by Doppler radar. *Geophys. Res. Lett., 2,* 183-184.

_______, L. D. Hennington, R. J. Doviak and P. S. Ray, 1976: Multimoment Doppler display for severe storm identification. *J. Appl. Meteor., 15,* 1302-1306.

Donaldson, R. J., Jr., 1970: Vortex signature recognition by a Doppler radar. *J. Appl. Meteor., 9,* 661-670.

_______, R. M. Dyer and M. J. Kraus, 1975: An objective evaluator of techniques for predicting severe weather events. *Preprints,* 9th Conf. on Severe Local Storms (Norman), AMS, Boston, 321-326.

Ray, P. S., R. A. Brown, and C. L. Ziegler, 1978: Doppler radar research at the National Severe Storms Laboratory. *Weatherwise, 32.*

Smith, R. L., and D. W. Holmes, 1961: Use of Doppler radar in meteorological observations. *Mon. Wea. Rev., 89,* 1-7.

These articles appeared in *WEATHERWISE* magazine, April 1979, Volume 32, Number 2.

WEATHERWISE is published by the Helen Dwight Reid Educational Foundation in association with the American Meteorological Society.

Heldref Publications, Suite 504, 4000 Albemarle St., N.W., Washington, D. C. 20016.